The Refrigeration Service Engineer

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No. 2

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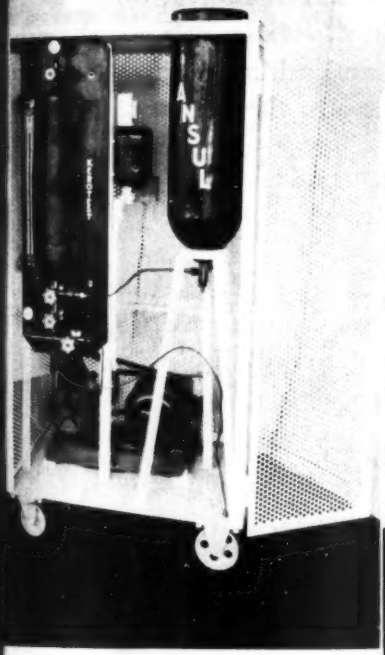

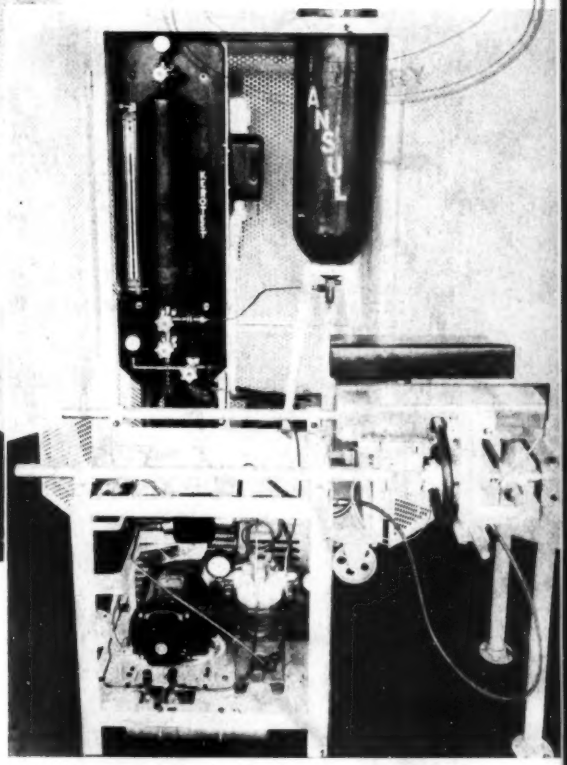

Replacing Electrolytic Capacitors—New Refrigerator Models, 1936—Questions and Answers—Lubrication—Milk Cooling

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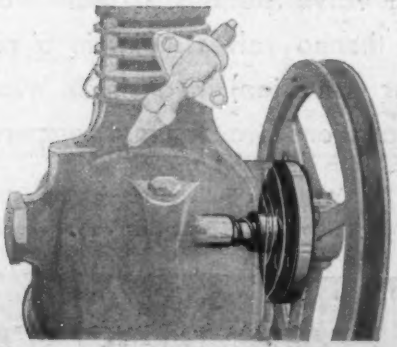
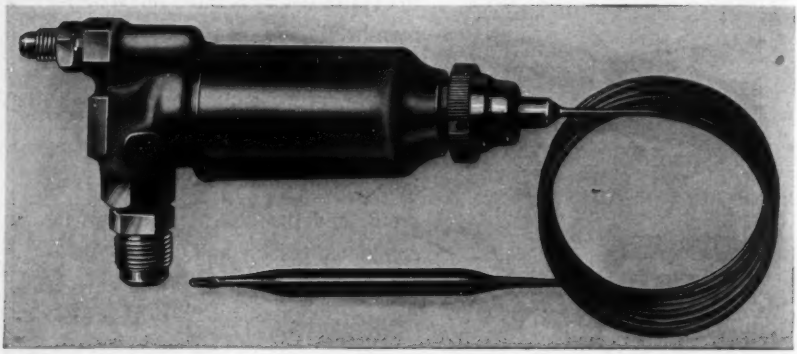


STANDARD REFRIGERATING APPLIANCES

BLUE RIBBON

THERMOSTATIC EXPANSION VALVES



These valves . . .

are distinguished from the automatic type in the following manner. The automatic type merely maintain a constant vapor pressure without regard to super-heat. On the other hand the thermostatic expansion valve permits a more variable usefulness in that the thermo valves maintain a constant super-heat (frosted over condition) in a single evaporator coil. In multiple installations two or more temperatures may be maintained.

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The REFRIGERATION SERVICE ENGINEER

Devoted to the Servicing of

REFRIGERATION UNITS *and* OIL BURNERS

VOL. 4 FEBRUARY, 1936 NO. 2

COVER

A PORTABLE unit for charging methyl chloride developed by the American Machine and Foundry Company, Brooklyn, New York, is shown on the front cover. Refrigeration units which are charged by this portable unit are used in connection with bread wrapping machines, and the entire charging equipment is moved directly to the machine that requires recharging rather than the usual system of taking the unit to the charging board.

LAST MONTH'S COVER

Inadvertently the name of the establishment in which the refrigerant charging outfit shown on the front cover of the January issue was omitted. In answer to a number of inquiries, the firm is The Harry Alter Co., 1728 S. Michigan Avenue, Chicago, Ill.

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In the "Genuine Detroit" Thermostatic Expansion Valve you have the advantages of a gas charged power element—the most outstanding development in this phase of refrigeration.

Gas charging limits motor overload by limiting suction pressures. It permits a better selection of motor for higher efficiencies because gas charging eliminates starting overload. There is no temperature lag and no flood-over to contend with when using the gas charged power element.

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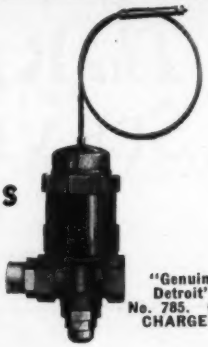
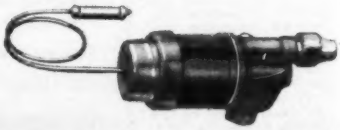


"Genuine Detroit" No. 785. GAS CHARGED.

"Genuine Detroit" No. 673. GAS or LIQUID CHARGED.



"Genuine Detroit" No. 674. GAS CHARGED.

Comparing "Pull Down" performance with liquid and gas charged thermostatic expansion valves.

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The Refrigeration Service Engineer

A Monthly Illustrated Journal Devoted to the Interests of the Refrigeration Service Engineer in the Servicing of Domestic and Small Commercial Refrigeration Systems and Oil Burners

OFFICIAL ORGAN REFRIGERATION SERVICE ENGINEERS' SOCIETY

VOL. 4, NO. 2 CHICAGO, FEBRUARY, 1936 $2.00 per Annum

Replacing Electrolytic Capacitors on Capacitor Start Motors

Electric Refrigeration Industry Adopts Capacitor Start Motor, the Use Of Which Greatly Reduces Service Problems. Introducing This Electrical Development to Service Men.

By HARVIE W. WHITBY*

DURING the last few years the electric refrigeration industry has almost universally adopted the capacitor start type of motor. Previously, while some few units were powered with split phase motors, the general standard of the industry was the repulsion-induction motor.

The great multiplicity of moving and wearing parts in the repulsion-induction motor resulted in a service problem of such proportions as to be in excess of what might be classed, "a commercially practical value." In the capacitor start motor, the comparable wear is virtually limited to the single contact switch, which, in normal operation, is open, and which only functions for a fraction of a second each time the motor starts.

The starting torque, or initial motive power, of the split phase motor made it applicable only to very small compressors, or to refrigeration units which were provided with mechanical unloading devices which served to remove the back-pressure and allowed the motor to start under virtually no-load conditions. Such devices, aside from being costly, introduced additional moving parts and further complicated the service problem.

The capacitor start type of motor made it possible to obtain starting torques of the order of 600 per cent (on motors up to ¼ hp.) without exceeding the 20 ampere starting current limitation provided for by the Fire Underwriters Laboratories. Hence we find the capacitor start motor retaining the simplicity of the split phase motor, and offering the higher starting torques than the repulsion-induction motor. Thus we have retained the good and avoided the bad features of both previously used motors.

The capacitor start motor introduces the service man to an electrical component which is a decidedly recent development,

* Sales engineer and Mid-western sales manager of Sprague Specialties Co., manufacturers of Sprague condensers.

and of which he, therefore, has very little knowledge—the electrolytic starting condenser.

Oxide Film As Dielectric

The electrolytic condenser utilizes an oxide film as a dielectric, and since this film is initially formed by the application of voltage, the tendency throughout the life of the condenser is to maintain, rather than destroy, this film. In this respect it is not subject to the continual deterioration which takes place in paper and similar dielectrics. In the absence of undue heat and the application of excessively high voltage, the life of the electrolytic condenser is almost infinite. "Infinite" is a difficult word to use, since man has never constructed anything that did not, in time, respond to the chemical destruction of the atmosphere. Since a definite chemical balance must be maintained for the successful operation of the condenser, one must realize that, however small, deterioration is taking place continuously, and that chemical destruction of the condenser is ultimately inevitable. The most reliable laboratories in the country have impartially investigated this phase of condenser life and estimate it at well upwards of ten years.

We have indicated that excessive heat and excessive voltage will hasten the failure of an electrolytic condenser. Since the film is formed to a very definite voltage, we can appreciate that the application of excessive voltage will result in increased losses which, in turn, represent heat. Thus we see that the real criterion of failure is temperature.

Such condensers as were offered to the refrigeration industry during the years of 1932-33-34 were capable of safe operation up to 155° F., though only rated at 135° F. While the ratings of standard condensers have not been changed at this writing, the condensers available today will not be appreciably endangered by operation at as high as 80° C. or 176° F.

Assuming that we have a faulty motor at hand, and that we have determined that the condenser has failed, let us not merely replace the condenser and call the job done. Let us bear in mind that the electrolytic condenser is rated to stand 20 starting operations per hour, each of three seconds' duration, or a total of one minute of service per hour. The average starting cycle is considerably less than one second. It has been suggested that we close the motor circuit, and time the period which the switch takes to "kick-out" by speaking the words "one naught naught one"—1001, and that if the start period exceeds this time, the motor and compressor should be checked for mechanical difficulty.

Mechanical troubles, for the most part, result in delayed operation of the starting switch, and also result in overloaded operation of the motor.

Effect of Overloaded Motor

A badly overloaded motor becomes unduly warm, and this heat is transmitted di-

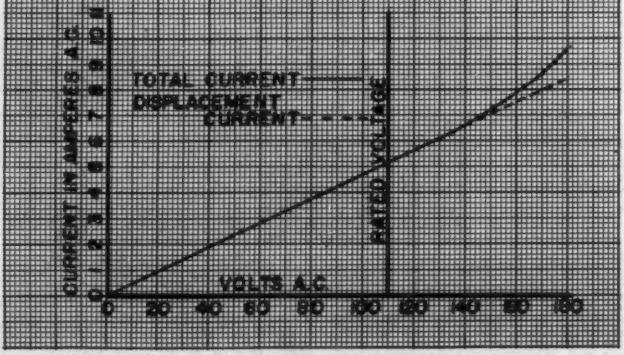


FIG. 1. VARYING RELATIONSHIP BETWEEN THE DISPLACED CURRENT AND THE IN-PHASE CURRENT IN A 110 VOLT CONDENSER OVER A WIDE RANGE OF VOLTAGE

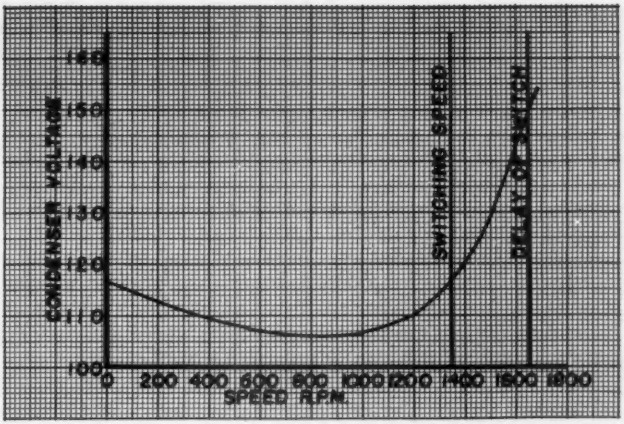


FIG. 2. VOLTAGE ACROSS CONDENSER PLOTTED AGAINST SPEED, AS MOTOR IS STARTING

rectly to the condenser, resulting in failure. The service man would do well to remember that in the event of very heavy overload for short periods of time, the motor start windings will invariably smoke, and may even fail before the condenser is injured. With this in mind, one can see that the premature failure of a condenser is invariably indicative of trouble elsewhere, and, too, of trouble that has existed to a greater or less degree over a fairly long period of time.

In terms of voltage rating, the condensers usually chosen for 110 volt motors are rated at 110 volts. Fig. 1 shows the varying relationship between the displaced current and the in-phase current in a 110 volt condenser over a wide range of voltage. At approximately 140 RMS volts we notice that curve *A* begins to leave curve *B* rapidly. The distance between these two curves actually represents the additional losses and additional heat developed in a condenser that is operated above its rated voltage. This illustrates graphically why the service man should assure himself, when replacing a condenser, that the new condenser is going to operate below 140 volts even at the highest line voltage that the unit is apt to encounter.

Fig. 2 shows the voltage across the condenser plotted against speed, as the motor is starting. We note that at locked rotor the voltage is of the order of the line voltage, and that it increases gradually to the point at which the switch disconnects the condenser. At this point, the average well designed motor applies less than 130 volts to the condenser at 115 volt line.

It may occur to the service man that, in nearly all cases with which he comes in contact, the motor develops considerably more starting torque than appears necessary to operate the refrigerator. This is true, but this surplus is required in very warm climates, in the initial operation of the refrigerator and in the event of extremely low line voltages, etc.

Even though the motor is supplying more starting torque than required, the service man cannot replace a condenser of one value with a condenser of lower value, without inviting trouble.

In Fig. 3 we show the manner in which the voltage across the condenser at switching speed changes with the value of capacity used, and we find that a reduction of capacity from one value to the next lower standard results in an increase of voltage across the condenser which carries it beyond the safe limits already established in Fig. 2.

A careful service man, in replacing a condenser only identified by the motor manufacturer's part number, will equip himself with a condenser unit enabling him to obtain any one of the standard capacity values, and an accurate A C voltmeter

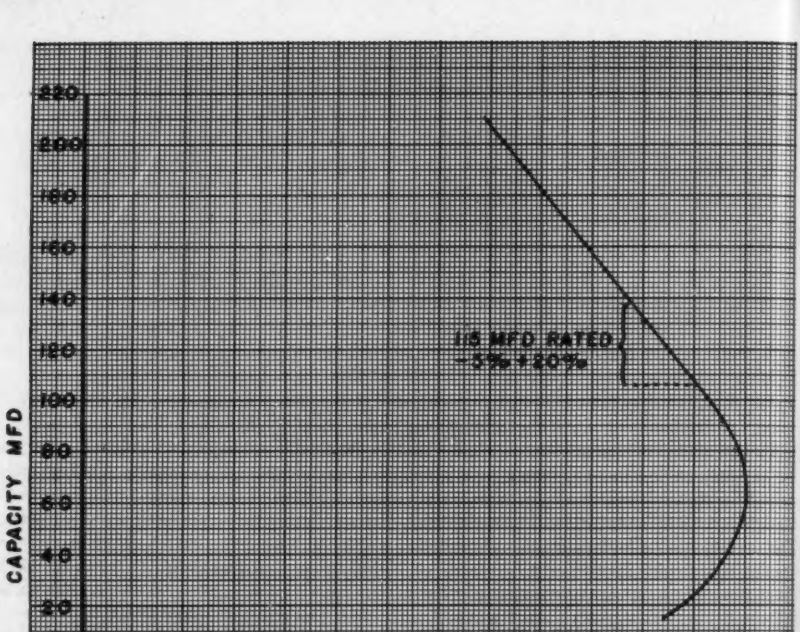


FIG. 3. SHOWING MANNER IN WHICH VOLTAGE ACROSS THE CONDENSER AT SWITCHING SPEED CHANGES WITH THE VALUE OF CAPACITY USED

(preferably covering two ranges, 0-150 volts and 0-300 volts) with which to measure the voltage across the condenser, at switching speed, and with the motor stalled. While the line voltage at the time of replacement may be anything from 100 to 125 RMS volts (on a 110 volt motor) the replacement should be made upon the basis of having a 125 to 130 volt line. It is safe to assume that the following ratio exists.

$$\frac{LV_1}{CV_1} = \frac{LV_2}{CV_2}$$

For example, if we have a line voltage of 110 volts at which voltage the condenser switching voltage is found to be 120 volts, then

$$\frac{110}{120} = \frac{125}{\times}$$

and the switching voltage at 125 volt line is approximately 136 volts.

The serviceman will invariably be safe in choosing the value of capacity which calculates a switching voltage of 135 to 140 volts at 125 volt line.

Referring to Fig. 4, we have the starting torque of the motor plotted against the value of starting condenser. We note that the torque increases to a point *X* rather rapidly with increase of capacity and with increase in capacity beyond that point the torque drops off rather slowly. Referring back to Fig. 3 we note that increasing the capacity results in a decrease of the voltage across the condenser. Obviously, then, if the correct value of condenser is not available, replacement can be effected safely with a larger value of condenser but not with a lower value. It might be well to qualify this last statement, as this is only true of

motors in which switching is effected by a centrifugal switch. The larger capacity might disturb the current conditions essential to the satisfactory operation of motors in which switching is effected by a relay. In such motors, no substitution of condensers can be safely attempted.

Generally speaking, standard refrigeration motors will take the condensers shown in Table I.

TABLE I. CONDENSERS OPERATED BY STANDARD REFRIGERATION MOTORS

	110 Volt	110 Volt	220 Volt	220 Volt
Hp.	25 C	60 C	25 C	60 C
¼	200-250 mfd.	115 mfd.	50 mfd.	30 mfd.
⅓	200 mfd.	110 mfd.	50 mfd.	25 mfd.
½	150-200 mfd.	80-100 mfd.	40 mfd.	20 mfd.

At no time, however, would we suggest that a service man should arbitrarily conclude the value of capacity required from the above table because individual refrigerator manufacturers may require a form of torque curve not obtainable with the aforementioned value of condenser.

Rather than confuse the service man, it might be well to point out here that there are a few refrigerator motors in the field with condensers on them that are switched out at about 190 volts. Unfortunately these condensers have been rated at 110 volts. A simple check, with suitable instruments, will quickly identify these motors. Replacement should be effected with condensers rated at 150 volts, which can be supplied by any of the condenser manufacturers.

Chronic condenser trouble on a given installation is usually traceable to faulty operation of one or more of the protective devices. By the same token the service man will appreciate that a condenser capable of continuous duty should be substituted for the electrolytic condenser when any lengthy adjustments of protective devices are undertaken. The electrolytic condenser of today is not a continuous duty device.

While our next and last point is, thankfully, quite the exception rather than the rule, we will occasionally run across a motor so badly burned up as to require rewinding in the local shop fitted for that work. It is a very important point to note that in re-

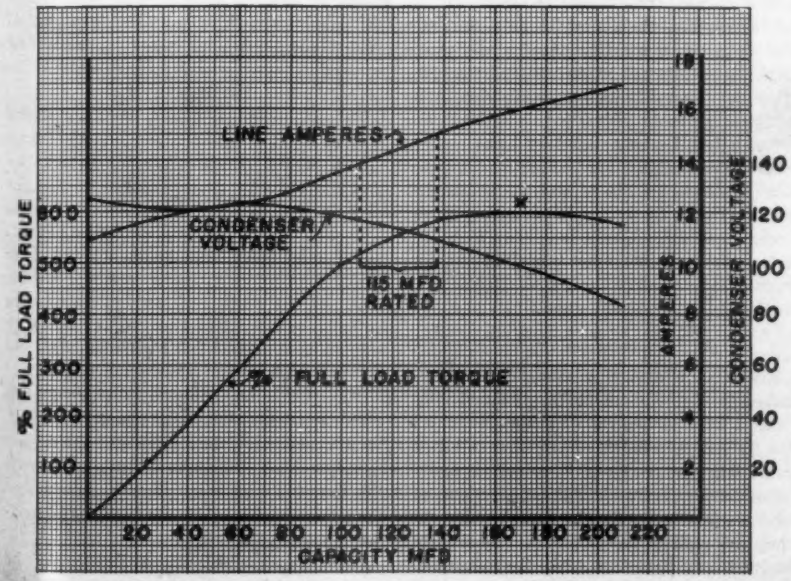


FIG. 4. STARTING TORQUE PLOTTED AGAINST THE VALUE OF STARTING CONDENSER

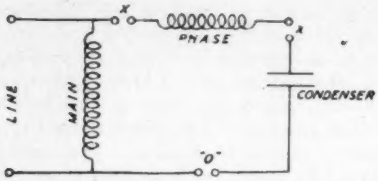


FIG. 5

connecting the windings, the switch should be located at either of the points marked *X* in Fig. 5, but never at point *O*, and that the condenser housing should be thoroughly insulated from the motor.

We are indebted to the Leland Electric Company for the data accumulated, and presented, in the accompanying curves.

New Refrigerator Models for 1936

Refrigerator Manufacturers Present Attractive Array in New Streamlined Exteriors and Interiors, Providing More Accessibility and More Convenience.

AS a means of meeting the demand of the buying public, many of the refrigerator manufacturers have already announced the new 1936 line, presenting an attractive array of refrigerators in new exteriors and improved interiors. Those who have not as yet announced their new models are expected to do so shortly. As for the exteriors, new styling is again emphasized, carrying the streamline idea a step further than last year. The interiors, too, have been rejuvenated with new and catchy ideas, under various trade names, for the purpose of providing more accessibility and more convenience. It is in these two features, improved exterior appearance and more convenient interior arrangements, that the 1936 models surpass their predecessors in bidding for increased interest and attention.

Kelvinator

Kelvinator Corp. new models were presented to distributors at the national convention held at Detroit, January 8 to 10. The 1936 line includes twelve models, all of which carry a five-year "Protection Plan" embodying guarantees against mechanical service troubles. Each model will be equipped with a thermometer, attached to the ice tray compartment, the first time this feature has ever been offered as standard equipment. With each refrigerator also will be furnished a certificate of low operating cost.

The cabinets were designed by Count Alexis D. Sahknoffsky, Russian designer, whose influence is seen in many automobiles, and who is known as a leading exponent of streamlining. Advertising, it is announced, will be concentrated on the standard line rather than on the Super DeLuxe.

The K Series has five models, ranging from 3.16 to 7.18 cu. ft. net food storage space, lacquer finished exterior with porcelain finished interior. Features of this line include built-in thermometer, five purpose control panel, totally enclosed cooling units with self-closing aluminum door, rubber grids in every tray, ice tray lifter, electric light, sliding shelf, rearranging shelf, extra large glass defrosting tray, and crisper with serving tray cover of black bakelite and utility basket.

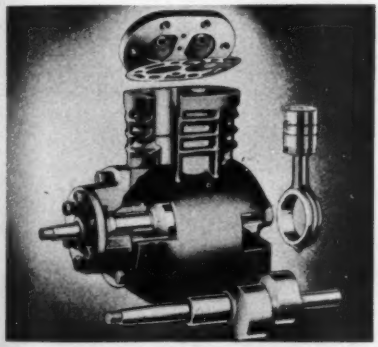
The PK series consists of three models with capacities of 5.16, 6.16 and 7.18 cu. ft. of storage space. These models have a rustproof, welded inner metal shell underneath the exterior porcelain panels. Other features are identical with those of the K models.

The Super DeLuxe models will be equipped with two compartments insulated

from each other, served by two evaporators and operating off the same compressor, providing different temperatures and each having its own door. One of these, refrigerated by a shell and tube evaporator, will provide low temperatures and rapid freezing. The other, refrigerated by a plate coil running down one side of the compartment, is for the storage of food and is designed to prevent dehydration. An interior fan provides forced draft circulation. There are four cabinets in this series with capacities ranging from 7.04 to 16.79 cu. ft. Two are single door models and the other two have two doors. Additional features include a refrigerated pastry set, water pitcher, sliding fruit drawer, a thrift drawer with three glass-covered china dishes. The two larger models also have five covered glass dishes on a revolving metal base which slides back and forth on the shelf.

Copeland

Effective December 1, 1935, the Refrigerator Sales Division of Truscon Steel Co.



CUT AWAY VIEW OF 1936 COPELAND

handles all sales of Copeland domestic refrigerators. The new Copeland and Truscon lines are now on display in dealers' showrooms. They are built entirely of steel and present a sturdy and substantial yet graceful appearance. The food compartment is welded in one piece steel with rounded corners to make cleaning easy, and double coated with acid-resisting white porcelain. The exterior is finished with Alchemik Primer, a Truscon product, followed by two coats of white lacquer finish.

Among the special mechanical features of this line are mirror finish of cylinder walls and pistons; Gisholt balancer for flywheels; twin cylinder compressors; and the use of precision gauges in the manufacture of all moving parts. For the styling, the simple lines and proportions of the Grecian Temple motif are used, a successful attempt to produce something more ornamental than a plain white box but not too ornate.

A special feature, new with this year's models, is the "four-in-one food file," a shelf which slides out making the back spaces more easily accessible. The hydrator and two food baskets immediately below this shelf also slide out together or independently. A tip-up shelf is provided along one side of the evaporator to make more space for tall bottles. A light turns on automatically when the door opens and turns off when the door is closed. Nine cold zones are available for either normal or fast freezing.

The line consists of three models of 9, 7.1, and 4.5 cu. ft. net food storage capacity.

Leonard

A number of selling features were disclosed in the presentation of the 1936 Leonard refrigerators at a meeting of distributors January 15 at Detroit. These features include the placing of the unit in the top of the cabinet, a built-in temperature indicator, machine welded cabinet construction, the use of "Freon" as the refrigerant, and a five-year protection plan. The use of "Freon," welded cabinet, heavier insulation and improvements in the condensing unit, it is stated, result in a forty per cent reduction of current consumption.

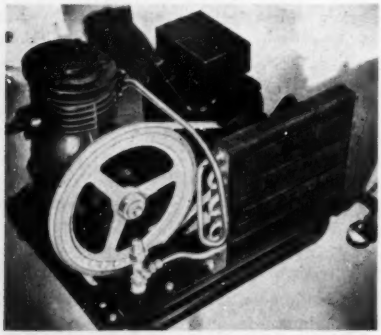
Features of the new Leonards, which are on all but the smallest models, include a vegetable drawer below the food compartment for storing dry vegetables, rubber equipment in every tray except special models, a rearranging shelf on the inside of the door, two refrigerated shelves for fast freezing, new tray release, newly designed food compartment, trigger action door handle, oblong shaped ice cubes, automatic electric light, all porcelain cooling unit, and a sliding shelf.

There are eleven models, divided into three lines. The P line is composed of four mod-

els having 5.15, 6.18, 7.25 and 10.59 cu. ft. of food storage space. This line has porcelain finish outside and inside. Five models composing the L line are finished in the new Leonard Permalin baked enamel on the outside with porcelain finished interior. The food storage capacities are 3.16, 4.15, 5.15, 6.18 and 7.25 cu. ft. Two lower priced models, finished in Permalin, are in the LS special line with 5.25 and 6.17 cu. ft. of storage space.

Stewart-Warner

The Stewart-Warner line for 1936 offers two new ideas, both designed to provide more interior convenience. One of these is the "Sav-a-step," a hinged compartment



SLO-CYCLE TWIN STEWART-WARNER

which swings out leaving the shelf space back of it readily accessible. The other is the "Slid-a-tray," a concealed tray or shelf which may be pulled out to form a shelf when it is desired to rearrange the contents of the refrigerator. The "Sav-a-step" also may be lifted entirely out of the refrigerator and placed on the kitchen work table or it may be hung on the inner side of the refrigerator door.

An eleven point cold control, lighted like a radio dial, is standard equipment. There are six trays of ice cubes containing 12 lbs. of ice in the larger models, and four trays containing 8 lbs. of ice in the smaller ones. All models are illuminated with a standard frosted light bulb that turns on when the door is opened. There are three freezing speeds for ice cubes—rapid in the bottom trays, medium in the center, and slow on top, with removable shelves for double depth ice trays.

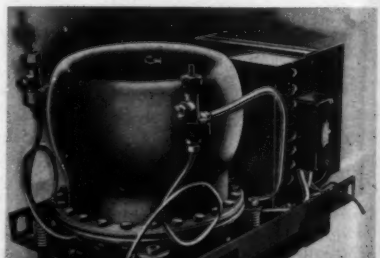
The top walls of the cabinet are welded together into one piece of heavy steel that enfolds the food chamber in a solid, unjointed housing. The top, sides and door are insulated with balsam wool fibre. All models except those that have a porcelain enamel exterior are finished in DuPont Dulux. The hardware of the DeLuxe models has a parallel line motif that blends with the modern design of the door. The latch is concealed inside the trigger door handle.

All models are equipped with slo-cycle twin cylinder compressors which are simple in design and machined with such precision that they run quietly.

There are ten models in the complete line, ranging in size from 4.5 to 8.1 cu. ft. net food capacity.

Crosley

Aside from the extreme styling of the Crosley Shelvador, the result of which is a beautiful job, other features include glass jars, quick action ice tray release, knee action door handle, and ventilated front. The DeLuxe models are equipped with a "Stora-drawer," new hermetic unit, hydrator, and evaporator door. The Shelvador, introduced early in 1933, is again one of the patented features of the Crosley line for 1936. It consists of six shelves permanently attached to the door. The "Stora-drawer" is a slid-



THE CROSLEY HERMETIC USED ON SOME MODELS

ing drawer at the bottom, for potatoes, onions and other bulk items. It is not refrigerated. A hydrator is furnished with each DeLuxe model. Eight freezing speeds of the temperature control are provided, including two stages for light usage which permit utmost economy when refrigeration demand is low. The complete line consists of ten models, ranging in capacity from 3 to 7 cu. ft. net food storage capacity.

The white porcelain interior is built with rounded corners and an acid-resisting bottom. The interior is welded into one piece and shelf supports are built into the porcelain lining. All models except the Table Shelvador are fitted with an automatic electric light.

The frame construction is a combination of wood and steel. The outer shell is of 20 gauge special refrigerator steel with Dulux exterior finish. The inner and outer shells of the cooling unit are welded together and tested for leaks under a pressure of 350 lbs. per square inch. It is made of heavy steel stamping.

The new hermetic unit employed in GAT and GKT series models is a reciprocating type compressor with a minimum of moving parts, pressure lubrication, spring suspension, and employs an oversize condenser with suction fan. The freezing units of the 6 and 7 cu. ft. models are of double width and have a middle shelf, full of circulating refrigerant, to provide very fast freezing. Shelves for the ice trays are made of copper. The standard unit is completely self-contained and can be removed by lifting it out of the top of the cabinet. If necessary, the unit may be changed without interrupting refrigeration. It is suspended on four springs to eliminate vibration.

Norge

An innovation in the Norge line for 1936 is a sliding utility basket for storing fruits and vegetables which pulls out to full length and tilts downward while anchored to the shelf support. This gives complete access to the contents of the shelf. A regular shelf rack is available when this basket is not desired.

Some refinements have been made in the line and contour of the Norge cabinet for 1936. Harmony and simplicity of design has been retained and all hint of squareness has been eliminated throughout the exterior. The mechanism compartment panel and refrigerator door have been redesigned, slightly convex in construction, and the refrigerator door top is designed to blend in with the smooth flowing lines of the refrigerator top.

The interior of the food compartment has been further improved with adjustable shelves, a sliding combination bottle and dairy rack. The lower portion has space for ample quantities of dairy products while the upper space will accommodate the tallest bottle. Rubber ice trays are standard equipment in addition to the regular and deep trays.

There are five basic models in the DeLuxe line, four models in the Economy line and two special models. All models are powered with the Rollator compressor.

Grunow

In the new Grunows, one piece rounded top construction and flowing streamlines follow the trend of modern architecture. This line has a simplicity of mechanism made possible by the refrigerant Carrene, which is a liquid, not a gas, under ordinary conditions. By using Carrene the need for complicated pressures is eliminated and thus is reduced noise, repair bills and electric current consumption. It is claimed that the Grunow unit runs less than twenty per cent of the time under ordinary conditions, and that less electricity is consumed than a small electric light bulb.

The company offers a four-year written guarantee on the sealed mechanism for $5.00. In addition, there is a standard free one-year warranty on the entire refrigerator.

A new demonstration kit has been introduced, designed for the use of dealers and distributors. These units are easy to carry and a convincing demonstration is easily made. Interested watchers see the mechanism make ice and the demonstration shows also the simple and economical mechanism. In another demonstration the salesman pours Carrene, the refrigerant, out into a glass, puts his hands into it and even drops a lighted match into it to prove that this unusual refrigerant is as safe as water.

Installing and Servicing (3rd Article)

Copeland Commercial Equipment

Additional Information and Instructions on Operating and Servicing Details of Water Coolers, Milk Coolers and Multiple Expansion Valve.

THE Copeland bottle and pressure type water coolers discussed in the following paragraphs are not in current production. The data will be of interest, however, to service organizations taking care of this equipment.

All Model B water coolers were completely assembled, tested, properly adjusted and ready for immediate use upon arrival from the factory. Each cooler contains a charge of 8 oz. of Freezol and the compressor contains ⅝ of a pint of compressor oil. The preliminary test should consist of a thorough and careful check to insure that leaks have not developed in transit, that the motor pulley and compressor flywheel are in perfect alignment and that belt tension is correct. After final test and inspection at the factory, the "A" and "B" valves on the compressor and the "C" valve on the liquid receiver are closed and must be opened after installation and preliminary test has been made.

Open the shut-off valve "B" on top of the compressor by screwing the stem out as far as it will go. Then release the Freezol to the expansion coil by opening valve "C" on the receiver. When pressure shows on the compound gauge, attached to valve "A," check the system thoroughly for any leaks that may have occurred during shipment by using the soap test. If no leaks appear, start the motor.

Check the suction pressure recorded on the compound gauge and readjust the expansion valve to a pressure of approximately 2 lbs. To adjust the expansion valve it is necessary to first remove the expansion valve insulation box. The use of this box and insulation materially increases the efficiency of the system and overcomes any difficulty resulting from a frosted expansion valve or suction line during humid weather, but no frost should form if the expansion valve is properly adjusted.

The water tank is of heavy cast iron with green porcelain interior. It contains a separate compartment for the expansion coil and another small cylindrical compartment accommodates the control bulb. The expansion coil compartment contains 2 qts. of anti-freezing solution made up of 30 per cecnt alcohol and 70 per cent water. The control bulb compartment is packed with grease to insure the conductivity necessary for proper control operations. The control bulb and the grease are retained in place through the use of brine putty, used to seal the end of the hole.

To remove the expansion coil from the expansion coil compartment, proceed as follows:

(a) With the compound and pressure gauges installed, close the "C" valve and pump the liquid into the liquid receiver.

(b) When compound gauge registers the lowest vacuum attainable in the system, stop the motor, and open the "C" valve slightly until the compound gauge registers zero pressure and then close the valve tightly.

(c) Close the "A" and "B" valves.

(d) Remove the expansion valve cover and kapoc insulation.

(e) Remove the ⅛ in. pipe plug from the expansion coil flange assembly and drain the anti-freezing solution from the coil compartment.

(f) Disconnect the liquid line from the expansion valve.

(g) Remove the six nuts from the studs of the expansion coil flange assembly, using a 9/16 in. socket wrench. The complete expansion coil assembly may now be easily removed.

To remove an expansion valve, disconnect the liquid line from the expansion valve and remove the two nuts from the studs of the expansion valve flange assembly, using a 9/16 in. open end wrench. After replacing a coil or expansion valve, always thoroughly evacuate the system and add a system dryer for an hour to remove moisture. Remove the top cover of the water cooler cabinet, remove the ½ in. pipe plug from the top of the expansion coil compartment, and fill with anti-freezing solution. Always replace the kapoc insulation and expansion valve cover after repairs have been completed.

The temperature control is adjusted at the factory to provide a water temperature of 45 to 50°. Colder temperatures should be avoided for practical as well as physiological reasons.

The Model "C" (city pressure) cooler differs from the "B" (bottle type) as follows: The water reservoir, instead of an open bowl, consists of a steel drum heavily tinned both inside and out. The expansion coil is wound around the outside of this drum and held by clamps. The entire drum with the coil attached is then tinned to increase the heat conductivity. This reservoir is mounted in an insulated compartment in the upper part of the cooler.

The control is located in the machine compartment with its bulb extending into the space above, where it is attached to the lower surface of the water drum by means of a special clamp. The expansion valve is mounted on the drum also but the refrigerant flows through the coil wound around the drum. Access to the valve is accomplished by removing the top cover plate.

To install a city pressure type water cooler, it is necessary to connect a city tap water line to the inlet fitting near the top at the back of the water cooler bowl. Place an ordinary hand operated valve in this line to be able to turn the water off in case servicing the cooler becomes necessary. A standard pipe union should be used to facilitate removal of the cooler. The line running from the water cooler fountain bowl to the sewer connection requires standard 1¼ in. pipe. After attaching the city pressure line and the drain line to the water cooler, the next step is to remove the top panel of the water cooler cabinet. This can be accomplished by removing the four screws which hold the panel to the top of the cabinet.

Now place the cooler in operation, testing for leaks, as in household work. Insert a compound gauge in the "A" valve on compressor. The expansion valve should be adjusted to provide a return pressure of approximately 2 lbs. The control has been set at the factory to deliver water at 45 to 50°. After adjusting the expansion valve and before replacing the cabinet cover, be sure to replace the rubber nipple over the valve, adjusting screw to prevent collection of moisture in the top of the valve. Adjustment of the stream of water is accomplished by turning a needle valve up or down to change the size of the orifice.

Milk Cooling

There are two general methods of milk cooling, by submersion and by aeration. Submersion, as its name indicates, consists of immersing the cans of milk in a brine or fresh water bath which has been previously cooled by direct expansion refrigeration system. Aeration is accomplished by running the milk over a coil through which is circulated cold water, brine, or both. It is not feasible to attempt milk cooling without the use of brine or fresh water to serve as a medium for the storage of energy. Since the milk must be cooled quickly, a great deal of refrigeration is required for a short length of time, and to provide this by the condensing unit alone, a machine of considerable size would be needed. The brine can be said to straighten the demand curve, permitting the use of a smaller unit and lessening the time required to lower the temperature of the milk to the proper degree.

Fig. 17 represents a typical submersion milk cooler showing the expansion coil supported on a rack which is placed around the inside wall. The level of the water bath is kept as high as possible to keep the ratio of water to milk as great as the capacity permits. When the cans are in place, the water level should rise almost to the overflow. Since the water surrounds and is in contact with the expansion coil and milk cans, it serves as a medium for the transmission of heat from the milk to the refrigerant. When

the cooler is not in use, the water is kept at a temperature of 35 to 38° by the coil and the only refrigeration load is that created by the leakage of heat into the bath through the insulation.

When the milk is submerged, its heat immediately begins to flow into the water and the temperatures tend to equalize, the water becoming warmer and the milk cooler. The condensing unit promptly begins to operate and helps to keep down the temperature of the bath, but the water really does most of the initial cooling. In two or three hours the milk will have been reduced in temperature to about 45° when it can be removed to a storage refrigerator, shipped, or allowed to remain in the bath. The water is now being lowered in temperature and after several hours will reach the cut-out point of the condensing unit.

Although it is possible to use water for an aerator instead of brine, the brine is popular because the temperature can be lowered far below the freezing point and thus permit the use of a smaller sized tank.

For milk cooling, the exclusive use of a multiple expansion valve with a temperature control on single installations is recommended. The multiple valve on the single coil is necessary to keep the suction pressure as high as possible. Brine temperatures fluctuate considerably and a variable expansion valve setting, such as the multiple valve provides automatically, is best. Moreover, a fresh water tank usually accumulates ice on the coil and the action of the multiple valve causes this to form more evenly than would be possible with the "regular" valve. The frost control bulb should be attached to or inserted in the suction line at the point where

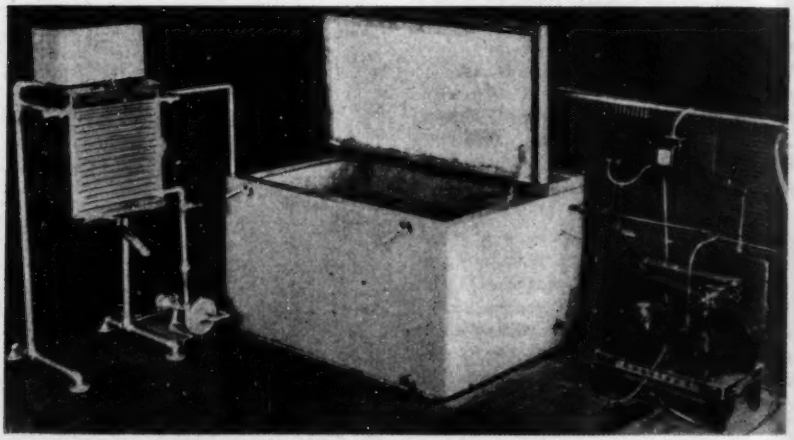


FIG. 17. TYPICAL SUBMERSION MILK COOLER SHOWING EXPANSION COIL SUPPORTED ON RACK

Another type of system which is considerably faster than the submersion method, uses an aerator with a double coil. The upper section circulates water, the lower section brine. Thus the milk is precooled in passing over the water coil and is given a final cooling as it flows over the lower brine coil. By regulating the flow of milk and the temperature of the brine, any desired temperature of the milk can be accomplished. After cooling the milk is placed in a storage refrigerator or is submerged until time for shipment. Al-

it leaves the liquid, about 2 or 3 in. higher than the overflow.

The temperature control will give best results for submersion tanks when inserted in a piece of 1 in. pipe which is placed along the bottom of the tank between the slats of the false floor. Tanks supplying brine or water for aerators, but which are not used for submerging the milk cans, should have the control bulb in the center near the top of the liquid level.

The water, of course, is kept as near the

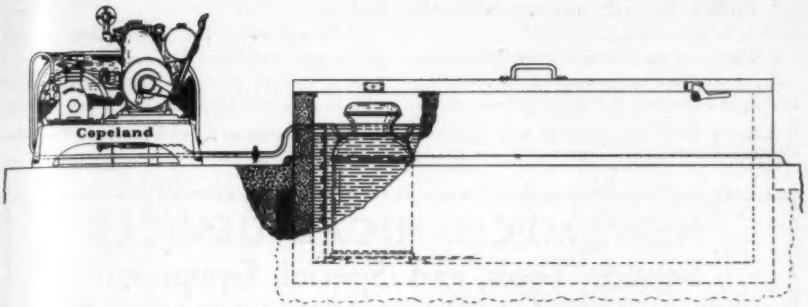


FIG. 18. MILK COOLING CABINET INSTALLATION

freezing point as possible,—usually 35°. Brine is maintained at from 18 to 21°, a three degree differential causing a running cycle of some length. If the amount of milk handled is less than one-fourth the brine capacity or one-fifth the water capacity, these temperatures can be raised to advantage.

All pipes conducting brine at low temperatures are to oe well insulated with cork. This insulation is particularly important where the lines are of great length or subjected to warm temperatures. A circulating pump of the centrifugal type is used in connection with aerators to circulate the cooling medium. This pump is operated manually by a hand switch and is left running during the process of milk cooling. If precooling with water is also used, the water is generally applied under pressure and no pump for it is necessary.

Dairy houses are often deliberately unheated and during the winter the temperature is very apt to fall below the temperature desired for the brine or water. Service men will find that under these conditions the temperature control may not operate and start the unit, even though the brine absorbs heat from the milk and becomes quite warm. This phenomenon is not only true of milk cooling but all other applications of refrigeration. Ordinarily a temperature control is placed in a warmer location than its gas-filled bulb and the temperature of the bellows does not affect the operation of the control because the vapor pressure in the three sections (bellows, tube and bulb) is governed by the temperature of the coldest part. There are many remedies for the foregoing condition, some of which are as follows:

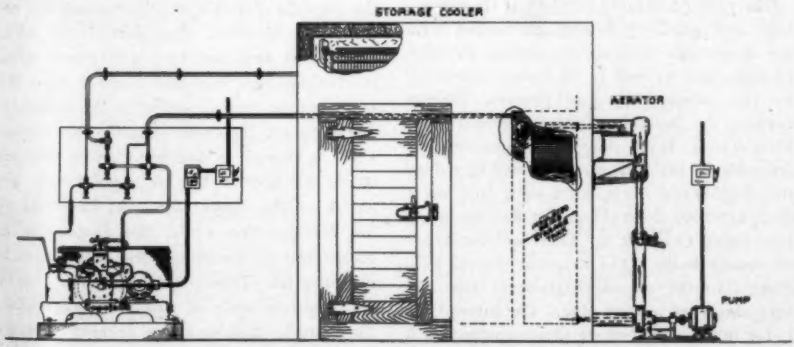


FIG. 19. DIAGRAM OF DAIRY INSTALLATION

1. Operate the unit manually while the milk is being cooled.

2. Place the control in a warmer location.

3. Apply heat to the control with an electric light bulb mounted directly beneath the bellows.

4. Change from the temperature control to the pressure type.

5. A control of special construction may also be obtained from the Copeland factory.

Editor's Note—This article will be concluded in the March issue with some further discussion of controls and presenting some miscellaneous servicing suggestions.

NEW MECHANICAL DEVICES
Service Tools and Special Equipment

Under this heading there will be published illustrated descriptions of new or improved service tools and equipment for the Service Engineer. Information contained in this department is furnished by the manufacturer of the article described and is not to be construed as the opinion of the Editor.

Thermo Valves

Illustrated Description of New Series of Thermo Valves Designed for Air Conditioning and Product Cooling. Installation, Regulation and Other Details of Interest to Service Men.

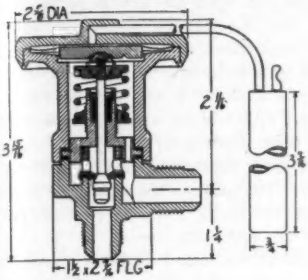
A NEW series of six thermo valves, designed for air conditioning and product cooling, has been announced by The Alco Valve Co., St. Louis, Mo.

These valves consist of only three major parts, the power assembly, the cage assembly, and the body. Forged brass, cold rolled brass, drop forgings, and stainless steel are used throughout and are machined to precision limits. The entire valve is assembled by only two cap screws.

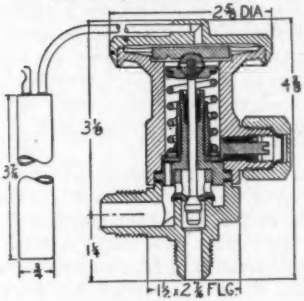
The power assembly consists of the remote bulb and capillary tubing, assembled with the diaphragm housing containing the diaphragm, and welded to the valve cage cover by the *atomic hydrogen* process, thereby forming a single hermetically sealed unit. Hydrostatic tests show that pressures of from 800 to 1000 lbs. are necessary to reduce the diaphragm. Life tests show that more than 8,000,000 flexings against 200 lbs. pressure failed to break it. There are two types of remote bulbs. The external remote bulb clamps to the outside surface of any size evaporator or suction pipe. The insert type is for installations where direct contact with the refrigerant is desirable. The valve cage assembly consists of all the working parts assembled into a single unit. The construction is such that friction is reduced to a minimum and there is no possible misalignment of parts in action. The valve body is a single forging which in itself is essentially a flange since it has a two-bolt male flange facing joining the body to the power assembly. There are no working parts within the body.

Alco thermo valves are actuated only by the superheat in the refrigerant at the remote bulb location. Superheat is the additional heat absorbed by a refrigerant when its temperature becomes warmer than the temperature corresponding to the evaporating pressure. The remote bulb of the thermo valve is placed in contact with or inserted inside the suction line at a point near the outlet of the evaporator. At the start of the refrigeration cycle, the evaporator is comparatively warm and the suction gas is superheated. These valves are applicable to any type or style of low side evaporator. They can be used singly or parallel or manifolded as required.

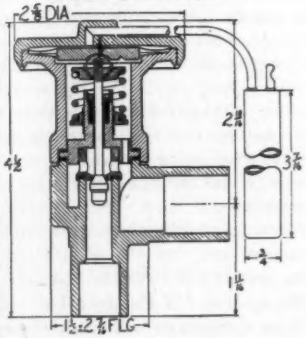
TYPE TL
Internal Superheat Adjustment



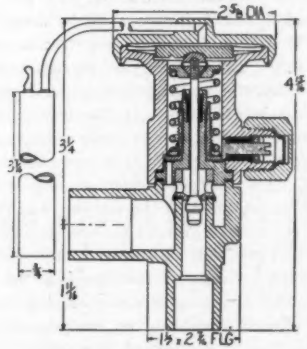
TYPE TCL
External Superheat Adjustment



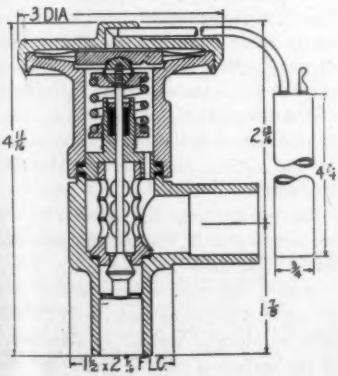
TYPE TAL
Internal Superheat Adjustment



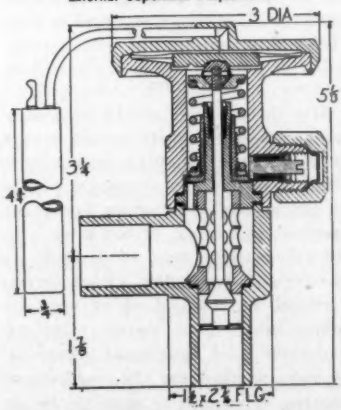
TYPE TDL
External Superheat Adjustment



TYPE TBL
Internal Superheat Adjustment



TYPE TEL
External Superheat Adjustment



DIAGRAMMATIC ILLUSTRATIONS OF NEW ALCO THERMO VALVES

If an Alco thermo valve of the proper capacity is installed in the liquid line to each unit of a multiple system, the evaporating surface for each unit can be designed for maximum efficiency, and thereby the desired conditions in each unit can be automatically maintained regardless of changes in load conditions within the range limit of the valve.

Where there is an intermediate distribution system or any restriction causing a pressure drop of more than four pounds between the thermo valve outlet and the remote bulb location, a false suction pressure will exist at the valve outlet, thus interfering with the proper operation of the valve. In such cases as well as all cases where the maximum superheat must be very low, an external equalizing tube should be used.

While it is seldom necessary to use magnetic stop valves with Alco thermo valves, certain extreme conditions may exist where their use is advisable. If the temperature difference between two or more refrigerated units in a multiple system is more than 20° F. an Alco magnetic suction stop valve should be installed in the suction line from the warm unit to prevent possible condensation of refrigerant in the cold unit during shut down periods. Furthermore, in the absence of an Alco magnetic suction stop valve, the continued operation of the compressor for the proper cooling of the colder units may pump out the evaporator coils of the warmer units, causing those units to become too cold even though the liquid feed to those units be entirely shut off.

Installation

An Alco thermo valve should be used to control the flow of liquid refrigerant to each refrigerated unit in a multiple system, or to each bank of coils in an evaporator. If a certain evaporator has too many lineal feet, too many abrupt turns, or too small pipe size, that evaporator must of necessity be split to permit proper flow. Each thermo valve should be installed at or near the evaporator inlet. Each thermo valve and its evaporator must both be of proper capacity and arranged for the requirement. Each thermo valve must be made for the refrigerant being used in the system.

The proper location of liquid and suction connections to and from the evaporator is contingent upon the design of the evaporator and the velocity of the gas as well as the requirements of the job, and should be arranged accordingly. Alco thermo valves may be mounted in any position and may be placed either inside or outside the cold area, but there must never be any restriction, such as a hand expansion valve or a distributor, in the line between the valve and the evaporator unless the valve is provided with an external equalizing tube.

An external equalizing tube connecting the external equalizing port in the valve to an opening in the suction line just beyond the remote bulb location should always be used when there is a pressure drop of more than four pounds between the valve outlet and the remote bulb location, or when the maximum superheat must be very low. Valves will be tapped ⅛ in. I.P.S. for external equalizer without extra charge when so ordered; or they may be converted in the field by closing the internal equalizing port in the valve cage and tapping the external port in the cage cover.

External equalizing tubes must permit free passage of gas, and can be made up from tubing and fittings purchased locally.

Where series "T" thermo valves with solder line connections are used, remove the valve cage, power assembly and all gaskets before making the solder connections.

A separate filter of adequate capacity is urgently recommended for installation directly ahead of each thermo valve, manifold or combination, regardless of any master filter that may exist elsewhere in the system.

A full opening, hand operated, stop valve is recommended for installation both ahead of and behind each thermo valve or combination.

The remote bulb must always be attached to, or inserted in, the suction pipe near the outlet from the evaporator.

Before attaching an external remote bulb to any surface, clean that surface thoroughly with an abrasive and apply aluminum paint if the surface is iron or steel. See that the entire length of remote bulb makes contact with the surface, then attach firmly with the

clamps supplied. A horizontal position on top of the pipe is preferable, and the remote bulb together with the pipe to which it is attached should be covered with adequate insulation.

Insert remote bulbs or line section remote bulbs are urgently recommended for all applications, particularly "short pass" evaporators; or where the remote bulb is subject to high velocity air or other media; or where the temperature surrounding the remote bulb is not comparable to the requirement; or where the actuating superheat must be very low. Apply insert bulbs through one end of a tee in the suction line.

Never install either type of remote bulb in any location where liquid refrigerant will trap. Handle capillary tubing carefully.

Be sure the system is thoroughly clean and dry before attaching thermo valves. Never blow the system with thermo valves in the line. Be sure there is plenty of refrigerant in the system, and that the liquid temperature at the thermo valve inlet is lower than the saturated liquid temperature for the corresponding pressure with the refrigerant used. This insures refrigerant reaching the valve in a liquid state.

Regulation

While Alco thermo valves may be had for any specified degree of actuating superheat from 1° to 24° F., the factory setting, unless otherwise specified, is 5° F. for air conditioning, or 10° F. for product cooling. All factory superheat settings are with 35° F. suction gas.

Increasing the adjusting spring compression causes the valve to control at a higher superheat. Decreasing the spring tension permits the valve to control at a lower superheat.

To change the actuating superheat on types TL, TAL, and TBL, remove the cap screws connecting the power assembly to the body; pull out the valve cage assembly from the cage cover; and rotate the hexagon adjusting nut on the threaded stem. One complete turn will raise or lower the actuating superheat approximately 3.5° F. at 0° F. suction temperature, or 1.5° F. at 45° F. suction temperature.

To change the actuating superheat on types TCL, TDL, and TEL, remove only the seal cap on the side of the valve, then turn the adjusting screw with a small screw driver. Turning to the right raises superheat, while a left turn lowers it. Four complete turns will raise or lower the actuating superheat approximately 3.5° at 0° F. suction temperature, or 1.5° at 45° F. suction temperature.

An alternate or auxiliary means of changing superheat at the evaporator outlet is to move the remote bulb. Moving the bulb back toward the valve increases the superheat; moving it farther from the valve decreases superheat.

To obtain highest efficiency from an evaporator, operate thermo valves at the lowest superheat possible without flooding back to the compressor.

Adjust each valve separately and wait between each adjustment to observe all results. Always tighten any loosened connections and replace removed seal caps.

NEW MASTER SERVICE UNIT

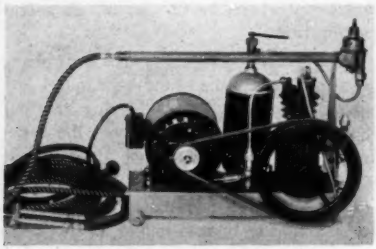
THE new Master Service Unit, introduced by the Curtis Refrigerating Machine Co., is a compact machine, 11 in. wide, 17 in. high, and 21 in. long. It weighs only 60 lbs., and can be used wherever electric current is available. The unit consists of a piston-type high efficiency Curtis compressor, a repulsion-induction motor, filters, dehydrators, reducing valve, safety valve, air receiver, propane drum, hose, torch, and gun. All equipment is mounted on a light portable base provided with rubber footing. It comes tested and ready for immediate use.

The propane drums are renewable and have a capacity of 25.3 cu. ft. of gas. One cubic foot will produce 2,500 B.t.u., as compared to 1,450 B.t.u. for acetylene; total cost of soldering or welding is reduced. It also eliminates the dangers attendant on the use of gasoline or alcohol, and combines into one compact unit everything needed for the following operations.

1. Soldering or brazing: The soldering torch attachment (included) produces an

immediate hot staple flame having a temperature of 4,000° F.

2. Testing: Any part of a system may be tested for leaks after assembly by adjusting the pressure of the Curtis unit and checking with oil. This saves the use of expensive refrigerant.



NEW CURTIS SERVICE UNIT

3. Leak detecting: The unit has been designed for use as a leak detector by using the suction hose around joints to be tested. The ordinary blue flame of the unit will turn green if methyl chloride or Freon is present. A 20-ft. length of hose makes it possible to test joints in inconvenient locations.

4. Evacuating systems: New systems may be evacuated of air by connecting the suction hose to the unit. It will quickly draw vacuum on the entire system.

5. Cleaning: A blow gun is furnished so that a constant supply of high pressure air is available for cleaning condensers, etc.

6. Removing gas from old systems: The unit may be used to pump all of the refrigerant out of a system into a container or out-of-doors when the regular compressor cannot be used.

7. Oiling larger compressors: By attaching suction hose and evacuating crankcase, new oil can be drawn into the crankcase through the suction gauge connection or regular opening provided for this purpose.

8. Setting pressure controls: The unit may be used to supply correct pressure for setting pressure controls. This eliminates the necessity of waiting for cooler or equipment to warm to a point where pressure may be set.

ALCO MOVES NEW YORK HEADQUARTERS

TO facilitate the expanding business in the New England district and adjacent territory, Alco Valve Company, St. Louis, Mo., has recently moved their New York branch into larger quarters. Effective February 1, the New York address is 381 Fourth Ave.

Mr. A. B. Schellenberg is the district manager, and in addition to the district sales office, a complete warehouse stock of Alco products is maintained for immediate delivery.

ADDITIONAL SIZES ADDED TO ROTARY LINE

A NUMBER of new sizes have been added to the list of Rotary replacement units for refrigerator seals, and have recently been distributed. This is in line with the company's policy of adding to the well-known sizes now on the market, and the complete list now includes fifty-one different units.

ANOTHER ALTER BRANCH OPENED IN CHICAGO

THE Harry Alter Company has recently announced the opening of a new south side branch, located at 7821 Stony Island Avenue.

This is in keeping with the policy of the company in extending their facilities for prompt deliveries to various sections of the city.

Branches in addition to their main office are situated on the west side, north side and south side.

CHICAGO HONORS UTILITIES ENGINEERING INSTITUTE DIRECTOR

THE Honorable Edward J. Kelly, Mayor of the City of Chicago, has appointed Fred P. Siebel, Sr., as a member of the Board of Education.

Mr. Siebel's ability to carry on the duties of this office is well known to everyone in the Refrigeration Industry. He is Vice President and a Director of Utilities Engineering Institute, old established refrigeration and air conditioning school.

THE Question BOX

Readers are invited to send their problems pertaining to the servicing of household refrigerators and small commercial refrigerating equipment as well as oil burners to "The Question Box" which will be answered by competent authorities.

THE following questions submitted to this department are answered by Mr. George H. Clark, chairman National Educational and Examining Board, Refrigeration Service Engineers Society.

Have any readers other opinions regarding the problems involved. Send them to the Editor.

Moisture Content and Boiling Temperature

QUESTION 108. *Correspondent desires to know the moisture content and its boiling temperature and whether its presence has any detrimental effect on a sulphur dioxide system. He states the reason he wants to have this information is: How well a job of drying and evacuating and at what temperature he should use when drying parts that have been cleaned, such as receivers and condensers.*

ANSWER: Moisture in a sulphur dioxide refrigerating system most emphatically does have a detrimental effect. It is apparent in the rapid eating away of valve needles and seats, compressor valves, the carbon sludge which occurs in the system, and the plugged screens and valves which occur as a result of the carbon sludge and in the eating away of seal parts, bearings, and the occasional sticking up of refrigerating compressors.

The job of drying receivers, condensers and such parts cannot be too thorough. A good way to dry such parts is to heat them to a temperature of approximately 250° F. and draw a vacuum on the various parts, which insures that all moisture will be removed. Water boils at 212° F. at atmospheric pressure; at about 190° F. at a 10 in. vacuum; at about 160° F. at a 20 in. vacuum and at about 80° F. at a 28 in. vacuum. Sulphur dioxide, of course, boils at 14° F. at atmospheric pressure, at zero degrees at 9 in. vacuum, at 32° F. at 8 lbs. gage pressure.

Nelson Ice Cream Cabinet

QUESTION 109. *I would like to ask a question about a Nelson 10-hole ice cream cabinet we have. The compressor is very hard to turn over. It seems like there is so much compression that when the compressor first starts the motor can't pull it. After the compressor has run a few minutes it seems to run easier or turn more freely, but even then it pulls the motor hard enough for the motor to run hot. When the motor first starts it will stall, but if you pull on the flywheel and help start the compressor it will run. I took the head and flapper valve off the compressor. The compressor then turned easily. The suction pressure is 2 lbs. and the head pressure is now 125 lbs. There doesn't seem to be any air in the system. Do you think there is too much refrigerant in the system? The system is direct expansion with an automatic expansion valve. What is the correct head pressure for the system? It is a 1/3-hp. 2-cylinder Universal compressor.*

ANSWER: The head pressure on the Universal Cooler machine using methyl chloride as a refrigerant should be from 80 to 95 lbs. gage in a 75° F. room. For temperatures above or below 75° F. the head pressure will increase or decrease approximately 2 lbs. per sq. in. per degree of temperature change.

It may be possible in your particular case that the compressor head valve does not open as freely as it should and that the pressure in the cylinder below the head valve float has to go extra high in order to force the gas through into the head of the compressor; or it may be that the motor has some defect which does not allow it to produce full power. Indications are that the motor is overloaded in some way. Since the load on the motor varies considerably with the suction pressure, a small overload on the motor when it first starts up is not

serious provided the load drops down after the machine runs a while.

However, if the motor stalls when attempting to start the compressor, it is quite probable that there is something decidedly wrong causing this. I presume you have checked the compressor for oil, and in addition, the valve opening should be gone into and the head pressure can be checked according to the method described.

Finned Evaporating Coil

QUESTION 110. *I would like to know the size of a finned evaporating coil of ⅝ in. copper tubing, and how to calculate it, for a storage house with the following dimensions:*

2.60 x 2.66 x 2.23 (meters)

with 4 in. cork insulation on sides and 6 in. on bottom; also the size of compressor needed for this job. This storage house is intended for keeping bottles of wine, barrels of beer, groceries, canned foods, etc. There will be also an electric bulb of 25 watts inside the storage house.

ANSWER: The refrigerator having the dimensions given and using 4 in. cork insulation will require from ¾ to 1½ hp. depending upon the usage to which the refrigerator is to be subjected. If the refrigerator is to be used chiefly for keeping foods cool and is not going to be required to chill the wine, beer, groceries and canned foods, etc., and the box is not to be opened excessively, a ¾ hp. machine will be large enough. If the refrigerator is to be used a considerable amount and the liquids and groceries are to be put into the refrigerator warm and taken out cold, it is probable that a 1½ hp. machine should be used. A 1 hp. machine for moderate usage should be satisfactory.

The temperatures which would obtain on the outside of the refrigerator were not specified, nor was the temperature that was to be maintained on the inside of the refrigerator. The above machine requirements were worked out on a basis of a 40° F. cooler and a 90° F. sustained outside temperature. The amount of coil that would be required would vary from 250 to 350 sq. ft. of cooling surface. The cooling surface should be maintained between temperatures of 38 and 12° F. The refrigerant temperature would probably vary from 38 to about 7° F. and the pressure control could be set for pressures corresponding to these temperatures. Since the problem of calculating the size of coil required for a refrigerator of this type is somewhat of a lengthy problem for a discussion here, I am not giving the method whereby these calculations are worked out. However, this information will be contained either in a bulletin or an article to be published in the REFRIGERATION SERVICE ENGINEER at an early date.

Ice Melting Equivalent

QUESTION 111. *Please explain the meaning of I. M. E.*

ANSWER: The letters I. M. E. stand for "ice melting equivalent." When one pound of ice at a temperature of 32° F. melts and turns into water at 32° F., it absorbs 144 B.t.u.'s so that in rating refrigerating machines we refer the capacity of the refrigerating machines to the equivalent number of pounds of ice which, being melted, would absorb the same amount of heat as the refrigerating machine. In other words, one pound I. M. E. is 144 B.t.u.'s; a ton of refrigeration is 2,000 lbs. of refrigeration; and generally the time in which this refrigeration is accomplished is given as 24 hours; so that one ton of refrigeration would be 144 B.t.u.'s per lb. I. M. E. times 2,000 lbs., which equals 288,000 B.t.u.'s per 24 hours. In one hour a ton of refrigeration, then, is 1/24th of this amount, or 12,000 B.t.u.'s an hour.

Outside Sweating

QUESTION 112. *If possible will you kindly advise me of any remedy for the sweating of the front outside section of a 60 cu. ft. box. The refrigerator, ¾ hp., methyl chloride, fin coil, thermostatic valve and pressure control, 4-door with a meat door compartment. Well ventilated back and front and at least three inches of clearance on the sides. Used in a kitchen where the refrigerator is at least 20 feet from the oven or stove. Unit is on same floor and directly behind the refrigerator; that gives 3-foot clearance between the box and another window; in fact, has a window on side in line with the front of box. The most sweating is in mornings.*

Furthermore, the meat door has warped so it will be necessary to renew the door. What has caused the door to warp? I paid particular attention to the circulation and there is no obstruction for free circulation.

Damp weather has been considered—this was the case when the box was first installed —mentioning that the box sweated from first of installation and continued thereon. Now that dry season is here, box still sweats. This box has three inches of insulation. Damp room and poor ventilation has been referred to above.

Mentioning the warping of meat door, will say that all other four doors are tight; tried same with paper all over.

The box does not sweat on any other side but the front.

ANSWER: The only reason for a refrigerator sweating is that the temperature of the exterior of the refrigerator is below the dew point of the air, which indicates that either the dew point of the air is high, indicating a high relative humidity or that the exterior of the refrigerator is cold.

Since the refrigerator you mention sweats only on the front section of the refrigerator, it would seem that the doors on the front part of the refrigerator are poorly insulated; or that the doors allow a certain seepage of cold air out of the refrigerator, causing the cold exterior temperature.

Calibrating a Float Valve

QUESTION 113. *I would like to have some information or data on "calibrating" a float valve; why it is done and how it is done. Also would like information on high side floats and expansion trap.*

ANSWER: When speaking of calibrating a float valve, we mean testing and adjusting the float valve so that it regulates the liquid level in the low pressure float evaporator to the proper level. The idea in calibrating the float valve is to see that it closes off at the proper level with the refrigerant that is to be used in the float valve.

SO_2 has a high specific gravity and since the buoyancy or lift of any float is equal to the weight of the liquid displaced by the float, the buoyancy of a float in a heavy liquid will be considerably more than the same float in a light liquid. With SO_2 the specific gravity is in the neighborhood of 1.4; that is, it weighs approximately 1.4 times as much as water. A float ball which would barely float or may even sink in water may float nicely in SO_2. Consequently water would not be suitable to use in calibrating an SO_2 float. We find, however, that carbon tetrachloride has a specific gravity nearly equal to that of SO_2; consequently if we make our calibration using carbon tetrachloride, we can depend on the float operating similarly in SO_2.

This may be done by using an old header from a discarded float valve. I have made up a float calibration apparatus by means of sawing off the bottom part of a low side float header at about the level the tubes were formerly soldered in. The front ring of the evaporator into which the float valve assembly is secured is left intact; then the header is fastened to a bench in the upside-down position, or in other words, leaving the opening at the top. The float valve may thus be secured into the header in the proper position and with a compressed air line throttled into the liquid connection of the float valve, I raise the level of carbon tetrachloride in the valve body and see that the valve closes off with a liquid level approximately three-fourths of an inch below the lowest refrigerant vapor outlet. The bubble test or the amount of bubbles which come through the carbon tetrachloride with the valve closed indicates whether or not the valve needle and seat is holding properly.

If we want to use a float valve in methyl chloride, we would have to calibrate the float with a different liquid, as carbon tetrachloride is considerably heavier than methyl chloride. In fact, the specific gravity of methyl chloride at low temperatures is very nearly equal to the specific gravity of water at normal room temperatures. Consequently water may be used as the liquid in connection with calibration of methyl chloride floats.

In connection with your question regarding information on high side floats and expansion traps, I am somewhat in doubt as to just what information you require. I presume you are concerned with the high side floats which are built into the receivers on some of the later types of refrigerators

and also with the loaded check valves which are used between the high side float valve and the evaporator. The loaded check valve which I presume you refer to as an expansion trap is a device which requires a definite difference in pressure in order to open the valve. That is, a particular loaded valve may require a difference in pressure of 30 lbs. in order to open the valve. The high side float valve meters the refrigerant through according to the liquid level in the float chamber or in this case, the receiver. Suppose the condensing pressure of an SO_2 machine was 80 lbs. gage. As the liquid level opened the float in the receiver, refrig-

(Continued on page 33)

Refrigeration Oils

Oils Used in Refrigerating Systems Have to Operate Under Very Low Temperature Conditions Which Makes the Pour Test Important. Some Characteristics With Which the Service Man Must Be Familiar.

By GEORGE H. CLARK, B.S.M.E.*

THE lubricants used in refrigerating systems have considerably different conditions to operate under than do the lubricants used in the automobile engines with which most of us are more familiar. In the automobile engines, the lubricants have to withstand quite high temperatures, fairly high bearing pressures, high piston speeds, etc.; and the oils are also occasionally subjected to low temperatures due to climatic conditions; but after the automobile engine is in operation, the temperature soon goes up and the oil is operating warm. Furthermore, the oil is not mixed with any other material to any great extent. In refrigerating compressors, the oil is not subjected to temperatures above 200° F. as a rule but it is subjected to temperatures of 0° F. and lower a considerable part of the time. The oil in most refrigerating systems circulates to some extent with the refrigerant. In the evaporator it may be chilled down to temperatures of 0, 20° F. below zero or even 40° F. below zero, depending on the application to which the particular refrigerating machine is to be put.

The viscosity of the refrigerating oils is usually quite low and of course as the temperature of the oil is decreased, its viscosity becomes higher and we are interested in the temperature at which the oil is no longer a viscous liquid but rather congeals so that it does not flow. For this reason we are interested in the pour test of the various refrigeration oils. We are also interested in assuring ourselves that any oils used in refrigerating machinery will be free from any acid which would tend to corrode valve parts as well as other parts of our refrigerating system. The color of the refrigeration oil of course is not important except as an indication of its other properties.

Tests to Determine Specifications

There are eight common tests made on oils to determine the various specifications which are a measure of the fitness of the oil for a particular purpose. One of these is known as the flash test. The flash test consists in determining at what temperature the oil is sufficiently vaporized so that it will flash into a flame upon being ignited. At this flash temperature, however, the oil will not support a continuous flame or will not continue to burn. Another test is the fire test, which is made to determine the temperature at which the oil will generate sufficient vapor to continue burning upon being ignited.

The test which measures the viscosity of the oil is one in which a definite volume of

* Detroit School of Refrigeration. Chairman National Educational and Examining Board, R.S.E.S.

oil is put into a container having a standard outlet orifice and a viscosity number is given to the oil which rates the number of seconds that is required for the sample of the oil to pass through the standard opening.

A color test for the oil consists in comparing it in color with a standard color chart. The color chart has numbers up to more than 100. However, the various oils used in refrigeration generally do not run above 2 or 3 on the color chart.

The pour test is the test made to determine the lowest possible temperature at which the oil will pour. This test may be made by having a sample of oil in a test tube with a thermometer in the oil and lowering the temperature of the oil five degrees at a time by lowering the temperature of a brine bath in which the test tube is suspended. When the sample of oil is chilled each increment of five degrees, it is removed and the test tube tilted; and if the surface of the oil changes or, in other words, tends to remain level although the tube is tilted, then the oil will pour. When a sufficiently low temperature is reached so that the oil no longer pours, or the surface of the oil does not change when the tube is tilted, the oil is below the pour point and the next higher temperature increment of five degrees is taken as being the pour point of the oil. For most refrigeration oils, this pour point will vary from —20° to —40° F.

An acid test is also made to determine if the oil contains any acid which might cause trouble in the refrigeration system; but in any good refrigeration oil this will show neutral; that is, the oil will not show either acid or alkaline reaction.

A Sligh oxidation test is also made of refrigeration oils by treating a sample of the oil with foaming sulphuric acid or, in other words, passing the sulphuric acid fumes through the oil to oxidize the oil. After the sulphuric acid gas is passed through the oil, the oil is thinned with gasoline and passed through an asbestos cloth filter and the amount of sludge is weighed and the weight of sludge filtered out gives the Sligh oxidation number. A definite volume of oil, of course, is used for this test and the weight units in which the sludge is measured is also a standard measure.

The dielectric strength of the oils is also tested and this dielectric strength is determined by taking two electrodes of one square inch area and one-quarter inch apart and imposing a certain voltage on these electrodes for a definite period of time to see if the oil breaks down and a spark passes from one electrode to the other.

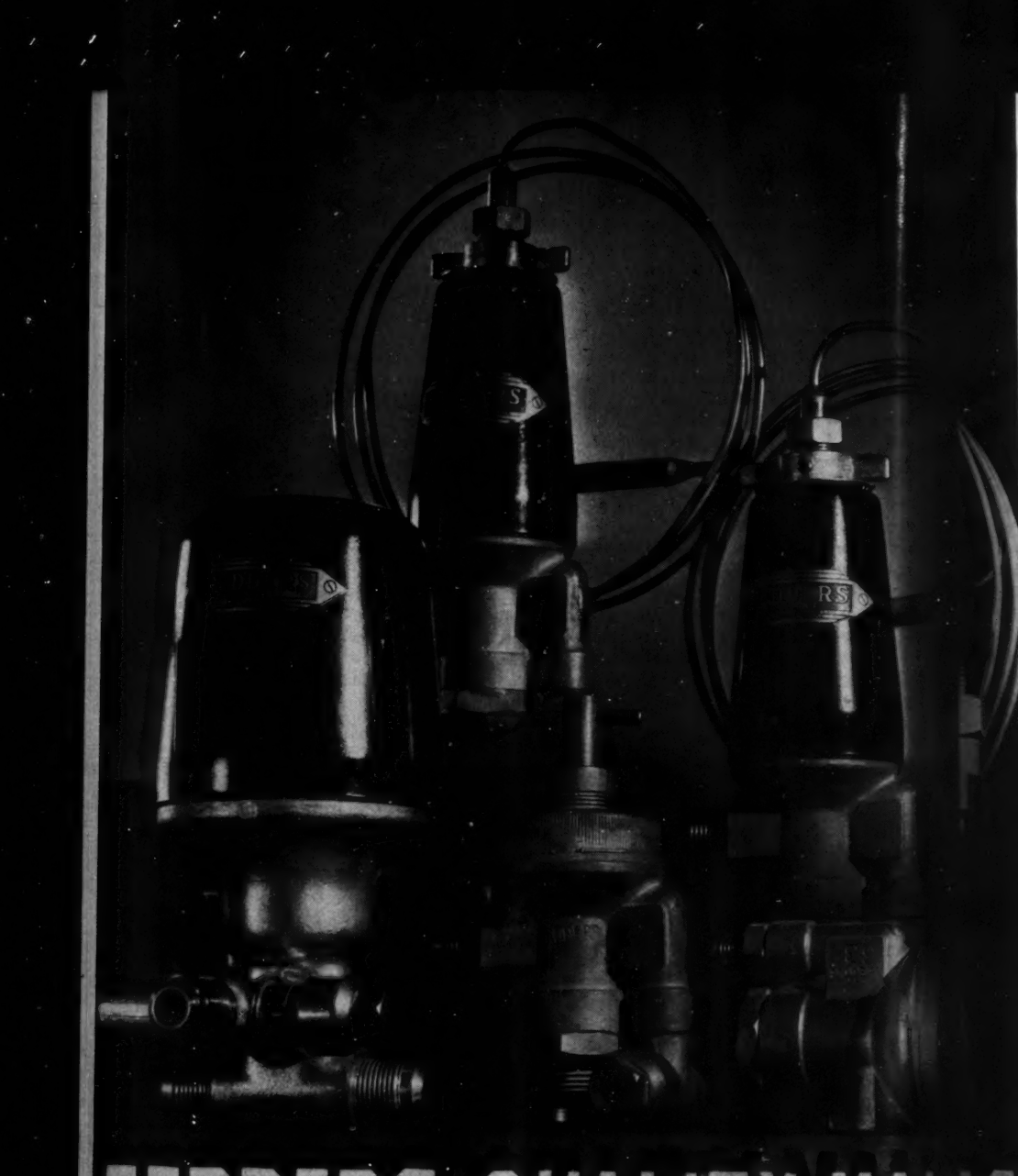
TABLE I. SPECIFICATIONS OF SOME OILS RECOMMENDED FOR REFRIGERATION USE

Oil No.	1	2	3	4	5	6	7	8
Flash test	275-285°F.	300-310°F.	330-340°F.	350-360°F.	.....	370°F.	.....	325°F.
Fire test	315-320°F.	345-355°F.	380-390°F.	410-415°F.	.....	420°F.	.....	375°F.
Viscosity at 100°F.	75-80	100-115	150-160	280-300	100	230	145	325
Color	1½	1½	2	2	.....	5	white	white
Pour test	— 40°F.	— 40°F.	— 35°F.	— 25°F.	— 30°F.	— 20°F.	— 20°F.	— 25°F.
Acidity	Neutral	.....	.....	.....	.....	.....	.....	.....
Slight oxidation test	15-25	15-25	15-25	12-22	.....	.....	0	0
Dialetric strength	25,000 volts	25,000 volts	25,000 volts	25,000 volts	.....	.....	.....	.....
Approximate cost in 50 gal. bbls.	$.40/gal.	$.40/gal.	$.40/gal.	$.40/gal.	$.32/gal.	$.56/gal.	$.915/gal.	$1.005/gal.

Specifications

Following are tabulated the various specifications of a number of oils put out by the various oil companies and which are recommended for refrigeration use.

Oils No. 1 through 4 are put out by one company and are recommended for various uses. Oil No. 1 is recommended for new, close fitting refrigerating machines of the reciprocating type. The oil has a low viscosity and consequently is especially suited to the machines having small clearances. This oil would probably be too light for rotary machines which depend more on obtain-



Illustrated above—Fedders Two-Temperature Snap Action Valve, Constant Pressure Valve, Model 33-HC[illegible]pacity Thermostatic Expansion Valve, Check Valve. Patented and Patents Pending.

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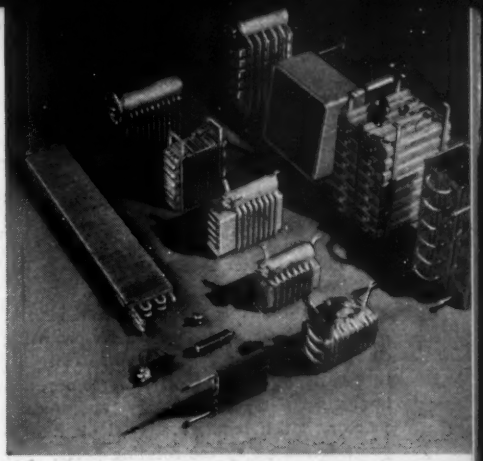

ATLANTA, GA.
Fedders Manufacturing Co.

BALTIMORE, MD.
Melchior, Armstrong, Dessau Co.

BOSTON (CAMBRIDGE), MASS.
Melchior, Armstrong, Dessau Co.

BRIDGEPORT, CONN.
Parsons Bros.

BUFFALO, N. Y.
Fedders Manufacturing Co.
Beals, McCarthy & Rogers
Root-Neal & Co.

CHICAGO, ILL.
Fedders Manufacturing Co.
Harry Alter Supply Co.
H. W. Blythe Co.
Borg-Warner Service Parts Co.
George Monjian
The Airo Supply Co.

CINCINNATI, OHIO
Fedders Manufacturing Co.
Merkel Brothers Co.

CLEVELAND, OHIO
Debes & Company

DALLAS, TEXAS
Fedders Manufacturing Co.
Beckett Electric Co.

DAYTON, OHIO
Allied Refrigeration Co.

DENVER, COLO.
Auto Equipment Company

DETROIT, MICH.
W. C. DuComb Company

FERNWOOD, MISS.
Enochs Sales Company

GREENSBORO, N. C.
Home Appliance Service Co.

HOUSTON, TEXAS
Walter Refrigeration Supply Co.
D. C. Lingo Company

INDIANAPOLIS, IND.
Langsenkamp Company

KANSAS CITY, MO.
Natkin & Company

LONG BEACH, CALIF.
Allied Refrigeration

LOS ANGELES, CALIF.
Fedders Manufacturing Co.
Franklin G. Slagel
United Refrigeration Products Co.

LOUISVILLE, KY.
Geo. Deh'er, Jr. & Co.

MEMPHIS, TENN.
Lewis Supp'y Co.

MINNEAPOLIS, MINN.
Refrigeration & Industrial Supply Co.

NEWARK, N. J.
T. W. Binder & Company

NEW ORLEANS, LA.
Enochs Sales Co.

NEW YORK CITY
Fedders Manufacturing Co.
Melchoir, Armstrong, Dessau Co.
Aetna Supply Co.
Paramount Electrical Supply Co.
Servicemen Supply Co., Inc.
Wholesale Radio Service Co.

PHILADELPHIA, PA.
Melchoir, Armstrong, Dessau Co.

PHOENIX, ARIZ.
R. R. Reynolds Co.

PITTSBURGH, PA.
William M. Orr, Co.

PORTLAND, ORE.
Stone Supply Co.
Refrigerative Supply, Inc.
Refrig. & Power Specialties Co.

SAN ANTONIO, TEXAS
Strauss-Frank Co.

SAN FRANCISCO, CALIF.
California Refrigerator Co.
Refrigerator & Power Specialties Co.

SEATTLE, WASH.
Refrigerative Supply, Inc.
Refrigerator & Power Specialties Co.

SIOUX CITY, IOWA
Refrigeration Supply Company

SPOKANE, WASH.
E. S. Matthews, Inc.
Electric Refrigeration Company
Refrigeration Parts Supply Co.

ST. LOUIS, MO.
Harry Alter Co.
The Spangler Company

ST. PAUL, MINN.
Thermal Service Co., Inc.

VANCOUVER, B. C.
Fleck Bros., Ltd.

WHITE PLAINS, N. Y.
County Seat Plumbing Supply Co., Inc.

FEDDERS MFG. CO.

57 Tonawanda St. **BUFFALO, N. Y.**

116 E. 16th St., New York. 303 E. Sixth St., Cincinnati. 200 S. Pearl St., Dallas. 603 W. Washington Blvd., Chicago. 175 Luckie St., N. W., Atlanta. 923 E. Third St., Los Angeles.

ing a seal by an oil film in order for the machine to pump properly.

Oil No. 2 is an oil used in reciprocating machines and is used in at least one instance as the standard production oil. This oil also has comparatively low viscosity and will probably seal the pistons in the cylinders slightly better than the other lower viscosity oil for all ordinary purposes.

The No. 3 oil is a commonly used general purpose oil suitable for the reciprocating compressors which may not be so close fitting as the new finely built compressors; and is also suitable for the rotary type of compressors which requires a good oil film to prevent leakage by the rotating parts. For air conditioning purposes, oil No. 4 is quite generally recommended. This oil has higher viscosity and it will be noted that the pour point is not as low as in the other oils. However, the higher viscosity is an advantage in the bearings of the machine which will operate under high pressures; and the higher pour test would have no effect in the air conditioning installations where the evaporating temperatures are considerably higher than in the low temperature refrigeration work. It will be noted also that the Sligh oxidation test is slightly lower than for the other oils. The price on this oil amounts to approximately 40 cents per gallon in 50 gallon returnable steel barrels and may be procured in the sealed gallon cans at 75 cents per gallon. Any of these oils of course are dehydrated so that they are moisture free.

Another company has oils 5 through 8 listed for refrigeration purposes. No. 5 oil is stated to be not such a good lubricant so that more oil is usually required in the same compressor than would be required with another oil. This oil is especially low priced, however, in that it may be obtained for approximately 32 cents per gallon.

The No. 6 oil is an all purpose refrigeration oil suitable for most reciprocating and rotary compressors. Its pour point is shown as being —20° F. and due to the comparatively high pour point and the high viscosity this oil would probably be less suited to extremely low temperature applications than would the oils listed under 1 and 2. This oil sells for approximately 56 cents per gallon in the 50 gallon steel barrels.

Oil No. 7 is a light white oil having a moderate viscosity and a —20° F. pour point. This oil is suitable where a white oil is preferred. Generally the white oils are preferred only where taste or odor is important, which of course generally has no relation to the oil used in a refrigerating machine. However, the white oils have a very low Sligh oxidation test number indicating no decarbonizing of the oil due to the sulphuric acid gas. However, if the Sligh test were made using a standard type of filter paper instead of the asbestos cloth as a filter, the filter paper catches approximately the same amount of sludge as will be obtained from one of the oils having the light amber color. The indications are then that the sludge formed by the sulphuric acid gas acting on the oils is finer in connection with white oils than it is in connection with the amber oils; so it may be possible that the sludge which forms in connection with white oils may circulate through the screens, filters and valves more readily than does the sludge which forms as the result of using the light amber oils. The sludge from the amber oils being somewhat coarser may have slightly more tendency to plug valve screens and filters.

Oil No. 8 is a heavy white oil and, it will be noted, has a higher viscosity than any of the other oils listed so that it would be suitable for rotary compressors; however, it would probably not be so suitable for extremely low temperature work.

Oils numbered 7 and 8 cost considerably more than the light amber oils. The light white oil costs approximately 91½ cents per gallon in 50 gallon returnable steel barrels, while the heavy white oil costs slightly over $1.00 per gallon when purchased in 50 gallon returnable steel barrels.

Vegetable and Animal Oils

Any of the above oils are good for refrigeration purposes and perhaps it is not amiss to mention some of the oils which are not suitable for lubrication of refrigerating systems. In this regard I might say that no vegetable or animal oils are suitable for lubricating any machinery such as refrigerating compressors, refrigerating motors and also automobile motors. There are a number of so-called "break-in" oils on the mar-

ket which are advertised highly for breaking in automobile engines. However, I am told by competent oil men that these so called break-in oils are decidedly harmful to the modern motor bearings and some automobile companies advise that they will not guarantee their engines when these break-in oils are used. It is decidedly wise to stick to purely mineral oils for all mechanical lubrication. In this connection one of the electric motor repair firms has stated that they will unconditionally guarantee any of their repair work against anything except the use of a well advertised brand of oil which combines mineral with vegetable oils.

I would say it is decidedly inadvisable to mix any graphite or other foreign substance in with any of the refrigeration oils unless the machine manufacturer specifically advises such practice. Where a compressor may be driven through gears, a certain amount of graphite mixed with the oil may be of some advantage and should do no harm; but where the oil is to be used directly in the refrigerant-containing parts of the refrigerating system, it will be well to use only the pure refrigeration oil.

Oil and Rubber

One thing which the refrigeration service man should know is that oil should not be passed through a rubber tube nor should it be allowed to come into contact with rubber at any time as in general there is a certain amount of free sulphur in the rubber which, in coming into contact with the oil, will produce a decidedly detrimental effect. The sulphur in the oil will have a tendency to separate various bearing metals from each other and is reputedly responsible for the plating effect which we often find in refrigerating compressors. This copper plating, which we notice in refrigerating compressors, is not the result of chemical reactions causing a form of electroplating but rather is the result of removing the copper from the brass and copper parts of the seal or other parts in the refrigerating system and burnishing the copper into the steel bearings. Any oil passed through a rubber tube where it may pick up sulphur will probably show a higher Sligh oxidation number after it has come into contact with the rubber hose.

Air Tight Container

Another thing which the refrigeration service man must be particularly careful about is the method in which he handles the refrigeration oils. The refrigeration oil should be kept in a container which is air tight while being carried around and in no case should the oil be left in an open can which is only partly full and which, due to the continuous rising and falling of temperatures, has a breathing action which may draw in moist air and breathe out drier air and thereby leave a certain amount of moisture in the oil. It should be remembered that ¼ to ½ drop of water in a refrigerating system other than a sulphur dioxide system will cause a mechanical freeze up in the expansion valve and also may cause some acid reaction in combining in some manner with the refrigerant. In the case of sulphur dioxide, any small amounts of moisture most decidedly will form an acid and attack the various parts of the refrigerating system. When oil is purchased in steel drums, it may be drawn off into containers for use in service and in doing so, the precaution must be taken to insure that the air which replaces the oil in the drum is absolutely dry. One method for keeping the air in the drum dry consists in installing a calcium chloride drier in the air vent into the oil drum. This will absorb the moisture out of the air as it passes through and tend to prevent the moisture from contaminating the oil.

There has been considerable discussion among refrigeration men as to the advisability of using white oils in comparison with the amber refrigeration oils. I am informed that the chief purpose in refining the oil to the white condition is to make the oil tasteless, odorless and so that it will not stain cloth or other materials. As far as refrigeration purposes go, the white oils, in connection with a sulphur dioxide refrigerating system which has drawn in a certain amount of moisture, will produce a carbon sludge in practically the same quantitites that would occur in connection with the use of amber oils. However, the sludge may be finer and may therefore circulate somewhat more freely with less danger of plugging screens and valves.

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Official Organ
REFRIGERATION SERVICE ENGINEERS' SOCIETY

THE FUTURE

SEASONABLE announcement of 1936 models, with extensive plans for making this year the best in point of sales, is the current activity of all of the refrigerator manufacturers. Appealing to the eye, the designs follow more closely the prevalent trend of streamlining apparently synonymous with today's speed. Included are a number of convenient accessories for the interior, making use of every available inch of space for food preservation. These convenience features have been designed to combine beauty with the utilitarian, and the entire effect is surely one of pleasing appearance.

Mechanical changes have been made, all tending toward the ultimate in performance and operation. Some manufacturers have adopted policies covering long-time service guarantees; others have designed their compressors as sealed or semi-sealed units; and some are furnishing a power consumption certificate for the consumer.

"What," ask many service men, "is this tendency towards the development of sealed units and long-time service guarantees going to do to the future of the servicing business?"

It might be well to reiterate at this point, a statement made in an early issue of THE REFRIGERATION SERVICE ENGINEER that all mechanical equipment is subject to some adjustment and servicing and, therefore, it can be presumed that following the experience of other industries that have shown the same consistent progress electric refrigeration has, increased sales and mechanical developments have always tended to stabilize and assure the future progress of the entire industry. This tendency in the refrigeration field has shown a definite advancement during the past several years when many manufacturers have found it desirable to place a portion of their servicing franchises, in many localities, in the hands of local concerns who are qualified to do a more effective and more economical job than the manufacturers themselves.

Also, another important trend assuring the future of the servicing business is the increased demand for commercial refrigeration. With the improvement in general business conditions, it can be reasonably expected that this source of business will furnish considerable work for service men. Naturally, as this class of refrigeration is oftentimes subject to more severe service than other types of refrigerating equipment, it is to the advantage of the service man and the service organization to direct their efforts in the building up of customer contacts in this field. Servicing companies can also expect to be a large factor in the sale and distribution of this equipment, as it has been demonstrated that a well-established community service organization, which has a reputation for quality work, frequently receives the first call for the recommendation of equipment most suitable to the requirements of users of commercial refrigeration equipment.

Another important development in refrigeration that may not be quite as far in the offing as some of us would believe will be the servicing on the smaller types of air conditioning installations. Possibly, many of your present commercial customers are anticipating such installations in their places of business. It is reasonable to expect that on such installations where the refrigerating equipment may not be operating satisfac-

torily, the refrigeration servicing organization will be called upon to do this work.

All in all, when we come to analyze the field as to the future of the business, it presents an encouraging picture in that it shows a healthy increase in the number of domestic installations now being put in each year, and the consequent service that will be required as these machines operate continuously over a period of time; the number of installations now operating for commercial purposes and the large potential market still available for the installation of such equipment; and last, but not least, the ever-increasing number of uses for which mechanical refrigeration is required, not the least of which is the big subject uppermost in the minds of so many business organizations today, air conditioning.

WHAT'S THE ANSWER?

To the Editor:

The well worded article "Dehydrators," by Mr. George Clark in the last issue of REFRIGERATION SERVICE ENGINEER, is one of the most vital topics confronting the general refrigeration industry where methyl chloride and "Freon" are used as refrigerants.

Water, high acid and sludge forming oil and the old methyl alcohol treatment have been the cause of many "headaches" to manufacturers and service organizations. The chemical reaction, commonly known as "copper plating," has been a bitter pill to swallow. This factor has been shrouded with as much secrecy as has our national monetary system.

I am of the opinion that more thought should be stressed on producing acid free mineral oils where proper viscosity is considered according to lubrication requirements and I caution service organizations to use the utmost care in purchasing oil even from so called responsible supply houses, as frequently the purchasing agents for these concerns "do not know their oil."

I contend a good vacuum pump with a wet bulb test operated for 12 hours on new installations, acid free oil and a gas tight system will eliminate many hours of lost sleep to the refrigeration engineer where contracts are taken on erection with a year's guarantee.

My years of education did not extend into chemistry or refrigeration engineering, but I have found many cases of copper plated systems that did not freeze up at the points of expansion, so I am wondering whether we will ever find a solution in the near future.

Here's hoping I can get a rise out of some of the readers with their honest convictions along with some of their experiences.

Yours very truly,
B. F. Woon, Des Moines, Iowa.

QUESTIONS AND ANSWERS

(Continued from page 26)

erant would be metered into the line between the liquid receiver and the loaded check valve. Suppose when this occurs the pressure in the evaporator is atmospheric pressure, or zero lbs. gage. The pressure in the line to the loaded check valve then will be 80 lbs. gage pressure or 80 lbs. higher than the pressure in the evaporator. Thus in such a system we would have three pressures instead of two; the pressure from the outlet of the compressor to the high side float valve would be 80 lbs. gage, the pressure from the high side float valve to the loaded check valve would be 30 lbs. gage and the pressure from the loaded check valve through the evaporator and into the suction side of the compressor would be zero lbs. gage. If the suction pressure were 10 inches vacuum, which would be 5 lbs. per square inch of vacuum, the pressure in the line from the high side float to the loaded check valve would be 25 lbs. per square inch gage, which would still be 30 lbs. higher than the pressure in the evaporator.

Frank Granonatti,
New Jersey.

On February 1st, I received your sample copy of THE REFRIGERATION SERVICE ENGINEER and was very much pleased with it. Therefore enclosed you will find a money order for one year's subscription. Please begin with the February issue.

REFRIGERATION SERVICE ENGINEERS' SOCIETY

Official Announcements of the activities of the National Society and Local Chapters appear in this department as well as articles pertaining to the educational work of the Society.

THE OBJECTS OF THE SOCIETY

To further the education and elevation of its members in the art and science of refrigeration engineering; with special reference to servicing and installation of domestic and small commercial equipment; for the reading and discussion of appropriate papers and lectures; the preparation and distribution among the membership of useful and practical information concerning the design, construction, operation and servicing of refrigerating machinery.

ASSOCIATION HEADQUARTERS: 433-435 North Waller Ave., CHICAGO, ILL.

JAMES H. DOWNS, NATIONAL PRESIDENT, RESIGNS

Change in Position is Reason for Action

JAMES H. DOWNS, who was elected President of the National Society at the annual convention of the Society in October, 1935, has forwarded to the Board of Directors his resignation as President due to a change in positions, which changes his classification as an active member to an associate member.

JAMES H. DOWNS, Cleveland, Ohio

February 7, 1936.

To the Board of Directors,
Refrigeration Service Engineers' Society:

Due to the fact that I am no longer actively engaged in the servicing of refrigeration equipment, I hereby tender my resignation as President of the Refrigeration Service Engineers' Society, effective this date.

At this time I wish to express my sincere appreciation of the fine spirit of cooperation which the members of this Society have shown. It is with sincere regret that I forward this resignation, as I realize that it will place the rest of the National officers under a real handicap. However, I am certain they are more than equal to the task, and that the responsibility of carrying on the good work of the Society is in capable hands.

Let me assure you that I shall always be personally interested in the welfare of the Society, and that you may count on my full cooperation in every possible way.

Cordially yours,
JAMES H. DOWNS.

With regret the Board of Directors under the circumstances have accepted the resignation, and in the vacancy of the office the 1st National Vice-president, Paul Jacobsen, will serve as Acting-president for the remainder of the present term.

Jim Downs has made many friends in the industry and his ascendancy to the presidency was in recognition of his work and interest which contributed so largely to the success of the second annual convention of the Society. Immediately on assuming office he took an active interest in furthering the purposes and objects of the Society and

had plans made for the further advancement and effective work of the organization as well as an increase in membership. These plans will be carried to a successful conclusion in the progress of the Society and we can always feel sure of the cooperation and support of Mr. Downs in our constructive moves in the interest of the organization.

Mr. Downs has identified himself with the Refrigeration Supplies Distributor at 2228 Chester Avenue, Cleveland, Ohio, and in his new position will have the opportunity of meeting with many of his service men friends in this locality in serving the interests of the industry in the distribution of parts, accessories, supplies and other equipment. His many friends in the Society wish him much success in his new business venture.

S S S

MEMPHIS WELCOMES YOU

TO all members and friends of the National R.S.E.S.

Last October the Memphis delegation attended the 2nd National Convention of the R.S.E.S. in Detroit. They travelled 1800 miles, made many friends and had many happy experiences. Incidentally they returned home with the 3rd National Convention of the R.S.E.S. (in the bag so to speak) for Memphis.

Fully realizing the important part that this chapter would be obliged to play by asking their friends to partake of Memphis Southern Hospitality, they nevertheless went about that task in a systematic and efficient manner. I am informed that the Chicago delegation can vouch for this.

They did not work for or want a convention that would fail to be an attraction to the exhibitors or one that would disappoint the visitors who attend, or in any other manner fail to be a credit to the National Society.

It is with these thoughts in mind that I desire to impart to you the knowledge of what has been accomplished in these first three months.

Immediately upon the return of the Memphis Delegation, our own Mr. W. Hall Moss, who was selected as 1936 Convention Chairman, myself and the other Officers and Members of the Memphis Chapter, began to get busy. We realized the only possible way we could have the kind of Convention we desired was by careful planning and proper execution of those plans.

GEORGE L. UETZ
President, Memphis Chapter

At a conference a short time ago between the following gentlemen: Messrs. H. T. McDermott, the National Secretary, W. Hall Moss, Convention Chairman, W. H. McDowell, Chairman of Local Chapter Finance Committee, Bruce Hale, Chairman of Local Chapter Entertainment Committee, and myself, the suggestion was made by me and approved by the Memphis Chapter that we would relieve the National Society of all local labor and planning that would be required to make a successful convention possible.

On behalf of the National Society, Mr. McDermott accepted our offer. All other matters are to be handled by Mr. Moss, the Convention Chairman.

I am happy to inform you that the Local Committees have been on the job for some time and results to date are as follows:

1. Date of convention suggested.
2. Hotel and garage facilities acquired and prices arranged.
3. Exhibitors' space arranged for and blue printed for Mr. Moss.
4. Photographers' requirements satisfied.
5. Broadcasting facilities arranged for (and later on you will receive a schedule by which you may tune in on our personal messages and invitation).

6. Finance committees appointed.
7. Entertainment committees appointed.
8. Ladies' committees appointed.
9. Complete entertainment features arranged which later on will make a story in themselves.

Mr. Moss informs me that requests from exhibitors are coming in every day and already show an increase of 8% over last year's results.

Only one thing remains to assure us that our labors shall not be in vain—

Your Personal Attendance

Therefore, it is with pleasure that I, in behalf of the Memphis Chapter R.S.E.S., sincerely and earnestly invite you to attend the Third Annual Convention to be held in Memphis, and partake of real "Southern Hospitality."

Cordially and respectfully yours,

G. L. Uetz,
President Memphis Chapter.

MEMPHIS CHAPTER DEDICATES OWN MEETING HALL

FEBRUARY 3 was a red letter day in the history of Memphis Chapter. On that evening the new meeting hall of the local chapter, located at 943 Madison Avenue, Memphis, Tennessee, was formally turned over to the members for their permanent meeting place. Although the chapter is less than a year old it has shown substantial progress in its activity and growth of membership and in securing the Third Annual Convention of the Society to be held in November.

The evening was well planned by President Geo. L. Uetz. The highlight was the interesting educational program. This consisted of an exceptionally fine talk by Mr. Dan D. Wile of the Detroit Lubricator Company on thermostatic expansion valves. In his usual efficient manner the subject was thoroughly

GROUP PICTURE OF PORTION OF THE ATTENDANCE AT OPENING OF NEW MEMPHIS MEETING HALL.

On the speaker's platform, reading from left to right, are: Frank Weidlein, Secretary-Treasurer of Memphis Chapter; H. T. McDermott, National Secretary; Ralph Logsdon, of the Memphis Chamber of Commerce; Geo. L. Uetz, President of Memphis Chapter; R. L. McCain, 1st Vice-president of Memphis Chapter; H. B. Thorndike, Western Sales Manager of Detroit Lubricator Co.; D. D. Wile, Chief Engineer of Refrigeration and Air Conditioning, Detroit Lubricator Co.; W. C. Easley, Chairman of Educational Committee of Memphis Chapter.

covered and the meeting extended into the late hours to provide Mr. Wile an opportunity to answer the many questions the members desired to know about thermostatic expansion valves.

Among the speakers of the evening were Mr. R. C. Anderson, residential sales manager of the Memphis Power and Light Co., whose subject was, "Social Benefits Derived from this Society"; Mr. Barlowe, chief engineer of McGregor's, Inc., Memphis Frigidaire distributor, whose subject was, "How Does the Educational Program Benefit Employer and Employee?"; Mr. H. T. McDermott, on the benefits to be derived from National affiliation; Mr. R. Logsdon of the Memphis Chamber of Commerce, who thanked and praised the Memphis Chapter for securing the convention.

ST. LOUIS CHAPTER

Meeting of January 9, 1936

By J. D. GRAY, *Secretary*
2512 Summit Ave., East St. Louis, Ill.

THE regular meeting of the St. Louis Chapter, held at the Crunden Branch Library Thursday, January 9, was called to order by President Gray at 8:30 P. M.

Mr. L. W. Krueger, in the absence of Mr. R. H. Spangler, gave a full report on the Educational activities for the coming year.

Correspondence from the National Headquarters was read by Secretary Plesskott.

The election of officers for the ensuing year resulted as follows:

President—E. A. Plesskott
1st Vice-president—H. J. Nettler
2nd Vice-president—O. Petri
Treasurer—L. L. Vollman
Secretary—J. D. Gray
Sergeant-at-arms—R. Lullman
Chairman, Educational Committee—E. Gygax
Board of Directors—R. H. Spangler, O. G. Tinkey, C. J. Brooks

Before turning over the gavel of authority, President Gray thanked the members for their support of the past year and expressed the hope that they would do even better for the incoming set of officers.

President Plesskott thanked them for being elected to this important post and expressed the desire for helpful, constructive criticism during his tenure. He reminded them he was merely an intrument and would have very little voice in the actual activities. He expressed deep regret that they could not see fit to get some entirely new "blood" into the offices and promised to serve to the best of his ability. He requested the newly elected officers to render every assistance

NEW OFFICERS OF ST. LOUIS CHAPTER.
Front Row, left to right: R. H. Spangler, E. A. Plesskott, President; J. D. Gray, Secretary; O. Petri, H. J. Nettler. Back Row: E. Gygax, O. G. Tinkey, L. L. Vollman, R. Lullman and C. J. Brooks.

possible and advised them that a meeting of all officers would be held in the very near future to outline the activities for this year and appoint men for the various committees to carry on this work.

Meeting of January 23, 1936

The regular meeting of St. Louis Chapter held at the Crunden Branch Library on Thursday, January 23 was called to order by President E. A. Plesskott at 8:30 P. M. The minutes of the previous meeting were read and approved.

President Plesskott appointed the following committee chairmen: Membership Committee—L. W. Krueger; Investigating Committee—Ray Lullman; Publicity Committee—R. H. Spangler; Auditing Committee—O. Petri; Entertainment Committee—H. J. Nettler. The remaining members of each committee are to be selected by the chairmen.

An Auditing Committee, consisting of O. Petri and R. H. Spangler, found the balance correct as shown in the Treasurer's report and recommended the adoption of a single system of bookkeeping to facilitate the checking of these records as well as the insurance of their permanency.

President Plesskott then introduced Mr. J. H. Spence, service manager for the Westinghouse distributor, who gave a very interesting talk on "Servicing the Westinghouse."

President Plesskott spoke briefly on the educational program for the coming year and promised many good treats. He also expressed it as his belief that our Educational Committee, composed of E. Gygax, chairman, C. J. Brooks and O. G. Tinkey, was second to none in the Society.

* * *

MEMPHIS CHAPTER

Meeting of December 16, 1935

By R. F. WEIDLEIN, *Secretary-Treasurer*
765 Ellsworth, Memphis, Tenn.

THE last regular meeting of the Chapter resulted in the appointment of a Nominating Committee—composed of Messrs. J. R. Woods, Ed Hunt and R. J. Rick—who made a thorough study of the wishes of the members of the Chapter and selected several candidates for each office. On the night of the election, after all other business had been disposed of, the candidates for each office were named on the blackboard and each member present was instructed to give a written vote for the one of his choice. The election votes were taken up by the Sergeant-at-arms—Mr. Ed Hunt—and tabulated by Mr. W. H. McDowell calling the vote and being registered by Mr. B. L. Bridges. The voting brought out much interest in the members pulling for their favorites and especially so when it came to the last member of the Board of Directors; in fact, the voting on the Directors was most keen all the way through, but the last member of the Board gave much work to the Sergeant-at-arms, the caller and the registrar, for several ballots had to be taken because of a tie between Mr. Geo. Dotson and Mr. J. R. Woods, but after much work on various members Mr. Woods was elected by one vote. The results of the whole election can be summed up as follows:

President—Mr. Geo. L. Uetz
1st Vice-president—Mr. R. L. McCain
2nd Vice-president—Mr. B. L. Bridges
Secretary-Treasurer—Mr. Ed Hunt
Chairman, Educational Committee—Mr. W. C. Easley
Board of Directors—W. Hall Moss, H. E. Adams, Boyd Evans, R. J. Rick, J. R. Woods

President Uetz made a very interesting talk, outlining his program for 1936 work and named his various committees and outlined their duties. At a later date a description of the Committee Program will be published. It was decided to install the officers at a banquet to be given next meeting—January 13—at which time all 1935 business will be closed and 1936 business will start with a rush—more new members, new chapters being organized, educational progress, successful convention, etc.

The following resolution was offered by W. Hall Moss to the Memphis Chapter of the R.S.E.S.:

WHEREAS, The ultimate welfare of the refrigeration industry is predicated upon the maintenance of maximum efficient operation of equipment in use by the customers, and

WHEREAS, This maximum efficient operation of equipment can be obtained only by

insuring the owners of equipment such a high standard of refrigeration service that their satisfaction with their refrigeration equipment shall be complete, and

WHEREAS, In order to insure a high standard of refrigeration service to the owners of refrigeration equipment it is essential to establish equitable, ethical and technical standards of service, and

WHEREAS, The present unorganized state of the refrigeration service field precludes all efforts to improve the establishment of equitable, ethical and technical standards or the quality of service to be made available to the owners of refrigeration equipment, and

WHEREAS, No attempt to effect organization among the personnel of the refrigeration service industry has been broad enough in scope or free from interference by outside interestate associations or commercial concerns, and

WHEREAS, It is our belief that in order to advance the field of refrigeration service, to establish equitable and enforceable ethical and technical standards, and to raise the standard of quality of refrigeration service available to the public. It is most advisable that service men everywhere shall enlist in a national association for the common welfare, and

WHEREAS, We have taken this initial step in having formed a local chapter of the Refrigeration Service Engineers' Society, therefore,

Be it therefore Resolved, That we send invitations to service men in the various cities of the south in order that they can reap the benefits and to effectuate the purposes as recorded hereinbefore, and be it further

Resolved, That as membership in this organization is open to all persons who are associated with and working with the refrigeration industry, their enrollment be solicited, and be it further

Resolved, That this Society shall cooperate fully and in every reasonable manner with the manufacturers, distributors, dealers and service organizations of the refrigeration industry and with other representative associations of the refrigeration industry, and be it further

Resolved, That as Memphis is to be honored with the Third Annual Convention of the R.S.E.S. in 1936, we make every effort possible to enroll as many new members and organize as many new local chapters as possible to enable the service men to benefit by the fulfillment of the purposes as recorded hereinbefore, and be it further

Resolved, That this resolution be forwarded to all chapters of the R.S.E.S. already formed with the request that they cooperate with us in this matter, to the furtherance of our aims and the reaping of the reward of better service to the customer and the resulting reward of satisfactory returns for our labors.

Meeting of January 13, 1936

New applications read and approved were: Mr. Robert E. Coley, 1500 Miss. Ave., Memphis, Tenn.; Mr. E. H. Ellis, 2408 Malone Ave., Memphis, Tenn.

Reports of Committees: *Finance:* Mr. McDowell, chairman—met with President Uetz at his office January 14, at 10:00 A. M. *Membership:* President Uetz, chairman, urged all members to help him bring the trophy offered by the National Chapter to Memphis at the end of this month. *Ethics:* Mr. Rick, chairman—report by W. H. Moss. Motion made by Mr. Brakefield and seconded by Mr. Hunt, that Ethics Committee draw upon the treasury for necessary funds to send out questionnaires. Motion carried.

Short discussion followed regarding questionnaires, whom to send to, etc.

Motion made by Mr. Hunt that Ethics Committee have surplus quantity of forms printed so that all members may have a copy if they wish. Seconded by Mr. McDowell. Motion carried with no dissenting votes.

Local publicity: Mr. Reihlmann, chairman—President Uetz reported that the Press-Scimitar would carry a report of the January 6 meeting, officers elected, etc.

Examination: McCain, chairman—Mr. Woods acting chairman—reported both of the applications voted upon tonight were satisfactory. *Entertainment;* Mr. Hale, chairman—Reported a profit of $6.80 on the banquet which was turned over to the secretary. *Educational:* Mr. Easley, chairman—

appointed Mr. Brakefield and Mr. Dotson as his assistants. Also announced that the representative of the Detroit Lubricator Co. will meet with us at the regular meeting of February 8, and discuss their product.

The following members took the obligation which was administered by Mr. W. H. Moss: Mr. Coley, Mr. Sparks, Mr. Sanders, Mr. Hardy, and Mr. Hale.

Communications were read from R. L. McCain and John W. McGregor, who sent a special invitation to all members to attend the Frigidaire Convention to be held at the Auditorium, January 21, starting at 9:00 A. M.

Motion made by Mr. Hunt and seconded by Mr. Woods that President Uetz write Mr. McGregor in Dayton regarding the Frigidaire Convention and the R.S.E.S.

Unfinished business: Secretary instructed to write letter of appreciation to the Memphis Power & Light Co., attention of the garage superintendent, Mr. Frank Libby, thanking them for the use of the chairs which they so kindly loaned us; also one to the Lewis Supply Co., attention Mr. H. E. Adams, thanking them and Mr. Adams, personally, for the cigars which every one enjoyed.

A rising vote of thanks and appreciation was given to all of the retiring officers and committees.

New business: Mr. Moss speaking about the convention and the different ways to raise money, thought it best to wait until the National Secretary came to Memphis before making too many plans about this matter.

A popular subscription was taken and the amount collected was $11.00. This was to be used for the purchase of the necessary lumber needed to remodel our meeting place.

Stove and floor lamps were donated by Memphis Power & Light Co. Wiring by the Bolton Electric Co. Sand, cement, and paint by R. F. Weidlein. Plastering to be done by Mr. Stanley. "Dam" and drain to be fixed by Mr. Woods. Door for cloak-room to be furnished by Mr. Brakefield.

Meeting of January 20, 1936

The meeting was called to order promptly at 7:30 by President George Uetz at our regular meeting place at 943 Madison Street. Roll call of officers showed all of them present except our 1st Vice-president, who was absent on account of business.

In the absence of the Chairman of the Examining Committee, President Uetz appointed Mr. Brothers as temporary chairman, who asked for Messrs. Black and Woods as his assistants. They examined the applications of Mr. Cecil L. Turner and Mr. C. P. Rawls, and reported favorably on both. These applications were duly read and accepted without a dissenting vote.

Reports of committees came up next with the Finance Committee asking for a list of the members owing for 1935 dues. The Secretary was instructed to give Mr. McDowell a list of these names with their addresses and amounts due.

President Uetz, reporting for the Membership Committee, stated that several new applications would be received before the first of February.

Mr. W. H. Moss, reporting for the Ethics Committee, reported that the questionnaires were ready to be mailed out and that approximately $15.00 would be needed for postage. The motion was made by Mr. Bridges and duly seconded by Mr. Hunt that an assessment of thirty-five cents per member be made to cover costs of the postage necessary to mail these letters, collection of this assessment to be made immediately; motion carried. The Sergeant-at-arms was told to make this collection, and while he was doing this Mr. Moss distributed a copy of the questionnaires to the members and visitors present.

As some of the members were not present when the meeting opened, roll call was delayed until this point of the program. Roll call showed twenty-one members and five visitors present. Visitors present were Messrs. Dupy and K. Rawls of the Dixie Engineering and Supply Co.; Mr. C. H. Boyd, representing the Alco Valve Co. of St. Louis; Mr. William Sudlow and Mr. Stanley.

Communications from Mr. H. T. McDermott to Mr. B. L. Bridges and President Uetz were read and discussed, after which special announcements were made to the dif-

ferent committees to make their arrangements to meet with Mr. McDermott when he arrives in Memphis on February 1st or 2nd.

Bills in the amount of $14.09 were read and duly approved by the Chapter.

Meeting was then turned over to Mr. Easley, who introduced Mr. Boyd of the Alco Valve Co., who discussed his product. His talk was very interesting and beneficial to all. Mr. Easley then read a letter from Ranco regarding their representative who wishes to meet with us in the near future.

The Educational Chairman gave the chapter five questions to be answered at the next meeting. He then read parts of Lecture 2 and discussed same thoroughly.

President Uetz asked all members who have not yet done so to sign the Constitution and By-laws.

Motion was made by Mr. McDowell and seconded by Mr. Evans that the Secretary be authorized to buy necessary stationery and also paint materials; motion duly carried.

A suggestion was made by Mr. Moss relative to the Educational Committee that the questions be written out on paper, one question to the sheet, and answered in that manner; also that members bring their lectures to each meeting with them.

MILWAUKEE CHAPTER

Meeting of January 7, 1936

By F. A. McLaughlin, *Secretary*
2143 N. 36th St., Milwaukee

THE annual meeting for the election of officers was held at the Metropolitan Hall, 541 W. Clarke Street. There were twenty-five present including two guests.

The meeting was called to order by President Tom Lester.

The minutes of the previous meeting were read and approved.

President Lester asked all present to introduce themselves, which was done.

The Secretary was asked to send a copy of the letter sent out and also a copy of the minutes of this meeting to Mr. McDermott.

Nominations were then in order for President. Moved and seconded that nominations be closed. Moved by Fred Boehme, seconded by Mr. LaDue that Jack Geering be elected president by acclamation.

On the first ballot Mr. Gugler and Wray Heath were tied. Second ballot taken and Mr. Gugler was elected vice-president. Wray Heath was elected secretary, Tom Lester was elected treasurer, and Leon Fey was elected sergeant-at-arms from the floor.

It was moved and seconded that the invoice for stencils, stationery, etc., be paid by the Treasurer.

A note of appreciation was read by the Treasurer from Miss Weber thanking the members of the R.S.E.S. for their kind remembrance at Christmas.

President-elect Geering then took the floor and asked the cooperation of the members during the coming year.

A motion was made and seconded that the Secretary send a letter of appreciation to the Ansul Chemical Company and Wm. Hyink & Sons for furnishing refreshments at the Annual Meeting.

CHICAGO CHAPTER

Meeting of January 14, 1936

By H. D. BUSBY, *Secretary*
5611 Lawrence Ave., Chicago, Ill.

THIS being the first meeting of the year almost the entire time was taken with the reports of retiring officers and the annual election of the new. President Jacobsen read his report for the past year, giving a complete resume of the happenings of the year, making a few recommendations for the coming year, and expressing his gratitude and thanks to the various officers and members for their cooperation with him. Next, the financial report by the auditing committee was read by the secretary and confirmed as being found correct by the auditing committee. A further detailed analysis of the year's expenditures and receipts was also read by the secretary.

Mr. Paul Jacobsen appointed as the nominating committee, Mr. Paul Krueger, chairman; Mr. Leo Roth, and Mr. A. Karlberg.

The nominating committee was requested to retire and make their selections. In the meantime Mr. Hendricksen and Mr. Clement were appointed as tellers to arrange the ballot, and instructions for voting were given by Mr. Jacobsen.

On returning, the nominating committee reported their selections for the coming year as follows:

President, Paul Jacobsen

1st Vice-president, Ivar Skipple

2nd Vice-president, Ogden Armstrong

Treasurer, Fred Roth

Secretary, H. D. Busby

Sergeant-at-arms, Percy Bossert

Board of Directors: Arnold Schroeder, Beecher Horne, W. S. Helmuth.

Chairman, Educational Committee, R. L. Hendricksen.

Additional nominations from the floor for each office in its turn were called for but none were made; therefore, a motion was made by Mr. Scher and seconded by Mr. Vanston and duly carried that one vote be cast by the secretary for the entire membership present, electing unanimously the above mentioned officers as nominated.

Mr. Jacobsen, in accepting the office as president again, thanked the members for the confidence they showed in him and outlined tentative plans for the coming year, such as—

1st. Necessary amendments to our constitution.

2nd. The establishment of a committee on ethics.

3rd. The setting up of an educational program for at least three months in advance.

4th. Bigger and better parties.

5th. More and more members.

6th. Securing more mechanical data on refrigerating machines from the manufacturers.

Mr. Oscar Heide, the newly elected president of the Masters' Association, who is also a member of this Society, was introduced and spoke briefly on his impressions of the Society.

The remaining newly elected officers spoke briefly on accepting their appointed office.

Mr. McDermott, our National Secretary, being present, spoke at length on what can be expected in the National Society during the year 1936, pointing out that they expect to double their present number of Chapters during the year and are well on the road to this end at present.

PRESIDENT'S ANNUAL REPORT

Chicago Chapter, January 14, 1936

Fellow Members of Chicago Chapter, R.S.E.S.—

Today we have our first meeting of the year 1936 with its election of new officers, and as your President for the year of 1935 I wish to present a report of what has taken place during this past and eventful year.

First, I want to say that it has been a pleasure for me to have been at the head of this chapter—it has been great to associate with all you gentlemen who are members here—and it has been exceptionally pleasant to work with my fellow officers during this past year.

You gentlemen all know that I have always taken great pride in the Refrigeration Service Engineers' Society, and in our own Chicago Chapter particularly, and it has pleased me to see the spirit of cooperation which is gradually coming through here, and I think that we have now found the right track on which we can forge ahead in the future without making too many sidesteps.

We have a membership which is second to none both in number and in spirit, and it is my hope that we may always occupy the position as the largest chapter in the National Association.

When my fellow officers and I started out in the beginning of January, 1935, this Chapter was meeting on Jackson Boulevard on the second floor—above a tire shop—we were in debt—very much so, and the only thing we had to our names was unpaid bills for the sum of some $300. The new officers could not let that hold them back, and we pitched in and got a program set up for the next six months and in March we started out with a talk by Mr. Fred Roth on the Chicago refrigeration code and questions were answered by Mr. Heintz, one of the city inspectors.

In April we heard about changing Frigidaire F-12 jobs over to SO_2, by Mr. Clarke Forman, and Mr. Harry Armstrong demonstrated a portable dehydrating outfit.

Mr. Beecher Horne told us about the Frigidaire super-line, and I gave a talk and demonstration on how to adjust the old style Nizer-Kelvinator pressure controls.

We heard all about the Kelvinator Wonder Model from Mr. John Northcote and a talk on shop management was given by Mr. Thomas Fowler. Our Mr. Harry Busby gave us ideas as to how a service charge may be figured out, and Mr. Lester Larkin paid us a visit and introduced to us his funny little B.t.u. men.

And the biggest thing of the year was the banquet which was held at the St. Clair Hotel; this was the first time that our Entertainment Committee, headed by Mr. Herman Goldberg, got into action, and a wonderful time was enjoyed by everyone present. The turning point of our chapter had been reached and from then on we started to show gain right along.

We enjoyed hearing Mr. Johnston of the Virginia Smelting Company tell us how they make SO_2 and seeing the moving pictures he had from the plant in Virginia.

In July we changed our meeting place from 2111 West Jackson Blvd. to the Majestic Hotel and had a stag party there which was very successful; and on top of that we had a fine picnic at the Waukegan Beach where all of us got a swim in the rough waters and plenty of sunburns. You heard the Louis-Baer fight on the radio at our meeting of September 24 and Chicago Chapter had Mr. Herman Scher tell us about a credit and collection system. This was held over for the National body

to decide on and this is now an established part of the R.S.E.S. benefits.

We had the National convention in Detroit, where Chicago Chapter had the largest representation of any chapter in the country and which has helped us to the extent that we are now recognized by many manufacturers and bodies who in the future will bring us many benefits and opportunities.

You heard what Mr. George Fawcett, service manager for Frigidaire, had to say about independent service and of the cooperation promised both by Mr. Fawcett and Mr. Kohlman of R. Cooper, Jr., who are General Electric distributors here.

You had an opportunity to try for certificate membership by passing an examination held this Fall, and you will have this same opportunity again sometime this Spring.

Mr. Martin of the Uniflow Corporation told you they were looking for independent service shops to take care of their service. And you will get calls from other manufacturers in the future.

Well, finally we moved to the Stevens Hotel where we have a beautiful meeting hall and we hope to stay put here now and enjoy ourselves in pleasant surroundings.

We had a Past President's party at which we could have had considerable more members than we did have.

You have furthermore, during this past year, had opportunity to associate with a lot of other people in the industry and I am sure that every one of you has benefited to some extent. If not in actual dollars and cents, in ways which cannot be figured in money.

All this you have received for only $5.00 during the year of 1935, and next year we will do considerably more for you because now we have the members and our expenses are more balanced to the income than ever before.

You will tonight get a complete report from the Secretary and Treasurer of the expenditures for 1935, but I wish to mention now that we have paid for everything that we received during this past year and besides that we paid off approximately $90.00 on the debt from the year 1934. When you consider the money we took in and what you have received for that money you will call it an accomplishment, and we still have a few dollars in the bank to start us off with in 1936.

We have increased our membership to 86 members out of which 76 are fully paid and 10 partially paid; this is an increase in membership of 48 members which is a record for all the chapters to shoot at.

The only regret I have is that 11 men who were members in 1934 did not feel that they should stay in the chapter during 1935.

When I was elected President in January, 1935, I was told that I had a hard job wished on me—well, I cannot say that it was all fun, but I have enjoyed it all immensely.

Of course, I had a great advantage in having officers who were willing to help me and I want to thank you personally, Mr. Northcote as 1st vice-president, Mr. Roth as 2nd vice-president, Mr. Ivar Skipple our good treasurer, and our eminent secretary, Harry Busby, Mr. Forman as sergeant-at-arms, and our board of directors Messrs. Hendrickson and DeGan. It has been a genuine pleasure for me to work with you and together we have accomplished things which none of us could have done individually.

I also want to thank the chairmen of the various committees for the work they have done this past year, especially Herman Goldberg of the Entertainment Committee, and as our chapter scribe; you have been a real asset to the chapter and to me during this past year and I sincerely hope you will cooperate as much with the officers of 1936 as you did with us this year.

There is one group that we do not want to forget, and that is the ladies. We have been very fortunate in bringing a number of them together at our social affairs and I know that they have enjoyed themselves very much. The more we can interest the wives in our Society the more success we are going to have.

I will suggest that we during this next year again elect a chairman of the Educational Committee in order to take some of the load off the officers' shoulders, and that he be responsible to the chairman of the Board of Directors and that he has programs prepared at least three months in advance.

In conclusion, I want to thank you all for the support you have given me during this past year—without you, the whole association would not exist—and I sincerely hope that we in this coming year can show you more material benefits; that we may be helpful in balancing the service business in Chicago, and that we may all prosper in 1936. Thank you!

PAUL JACOBSEN, *President*,
Chicago Chapter.

SECRETARY'S REPORT

Chicago Chapter, January 14, 1936

Under the very able leadership of our President, Mr. Jacobsen, I feel, as I am sure we all do, the Society has made very rapid strides during this past year. The greatest part of our success, without doubt, has been due to the hard work and efforts of our President. Few of us realize the great amount of personal time and expense he has expended in his efforts toward the betterment of our Chapter. I feel that Mr. Jacobsen during this past year has set a precedent which is going to be hard for any future president to live up to and certainly very difficult to beat.

Besides the monetary gains we have made and the gains in membership, as the yearly report has shown, we have gained tremendously in prestige and recognition among the various allied lines in the industry. Manufacturers are now coming to us for lists of our membership with a view to using them as the preferred lists in their dealings with the independent service companies, and some are requesting the opportunity of talking on our educational program and voluntarily coming forward to offer every cooperation where formerly it was necessary that we solicit such talks and cooperation and it was then, in many cases, rather grudgingly given. Along this line also we find men voluntarily joining our organization now where formerly it was necessary to sell them on the idea of joining and then many of them stayed just a short time and were never heard of again. Our present membership is of a higher caliber of men and I believe I can speak for them to the extent of saying that they find the meetings interesting enough that they come to them regularly. Our average attendance at least shows this must be true.

Among our gains for the year we can list as a very important one our graduation in two jumps from a rather dingy loft for a meeting place on Jackson Boulevard to the Stevens Hotel, the largest hotel in the world, and, believe it or not, the surprising thing in this is that it was accomplished with a considerable reduction in our expense.

This leads me to our very worthy Chairman of the Entertainment Committee, Mr. Goldberg, who, I am sure, we will all agree is one of the hardest working members we have. Mr. Goldberg is supposed to be chairman of the Entertainment Committee but he is also the Committee itself since at no time has he had any helpers and has done all of his work alone.

Among the most notable things done by Mr. Goldberg during the year have been the arranging of the several successful and enjoyable social affairs put on by the Society, such as, the annual banquet, the stag party, the picnic, the Past President's night, and the numerous other little affairs such as serving refreshments after the meetings.

At the beginning of the year a resolution was passed that any member securing five or more new members for the Chapter would be awarded a free membership for the coming year, 1936. Those eligible for the award under this offer are, Mr. Goldberg, Mr. Fred Roth, and Mr. Jacobsen.

Regarding the secretarial job, I wish to say that I have endeavored throughout the year to handle this in as diplomatic and businesslike manner as possible. I have tried to bear in mind that, insofar as our contacts through correspondence are concerned, the secretary is the Society since it will be judged considerably by the type of correspondence sent out. I have found this to be the most important part of the job, the rest being primarily routine work. Part of this routine is the mimeographing and sending out of the meeting notices twice a month. Shortly after taking over the job I undertook to do the mimeographing of these notices myself instead of as formerly was done, letting the work out to someone else at a cost of approximately $2.50 per meeting. This has represented a considerable saving to the Society and I believe should be considered a part of the secretarial job in the future. To help in this work a resolution was passed at our regular meeting of November 12, authorizing the secretary to purchase a mimeographing machine at a cost of not more than $30.00 when it became necessary.

I have found that certain changes are necessary in our routine to speed up the handling of accounts and to gain better control of our finances. Under our present system neither the secretary nor the treasurer know at any time just how we stand and it is usually quite a task to find out. Also, under our present system it would be very easy to lose track of accounts entirely.

I propose for the coming year that account books be set up and kept by the secretary. That the secretary receive and disburse all moneys of the Society. That all bills be paid by check which checks shall be drawn and signed by the secretary and countersigned by the treasurer. In other words, that everything be handled through the secretary and that the treasurer only receive money at the meetings as an aid to the secretary and countersign all checks to be paid out. In this manner all the business of the Chapter will be under the control of one man and he should have a better opportunity of keeping it in order and thus avoid so much confusion and delay. In later years when the Society has grown sufficiently, it will, no doubt, be desirable to bond the secretary, as specified in our Constitution.

In closing, gentlemen, I wish to state that I have enjoyed my job during the past year and have given it all I was capable of giving. I wish to thank my fellow officers for what I feel has been a very worth-while experience and privilege to work with them and to thank them and the membership in general for their cooperation with me.

H. D. Busby, *Secretary*,
Chicago Chapter.

Meeting of January 28, 1936

Two new applications for membership, from Mr. Clayton L. Lang, United Motors Co., and Mr. G. A. Rempe of the Rempe Coil Co., were read.

Mr. Jacobsen appointed his Committee on Ethics as follows: Mr. Jacobsen, chairman, and Messrs. Scher, Busby, Drownes, and Schroeder.

Mr. Jacobsen next read an article found by him in the magazine called "Power," extolling the advantages and desirability of joining the leading society of your profession. He also stated this article would be printed in our official organ so that it may be read at leisure.

Mr. Jacobsen asked the membership in general to write a letter outlining their wishes as to the nature of our future educational program. This program will be printed and scheduled for at least three months in advance.

He also announced that starting next meeting a talk by our Educational Chairman, Mr. Hendrickson, will be given on the lecture course, starting promptly at 8 o'clock each evening and continuing for a half hour before the regular meeting session.

The meeting was turned over to Mr. Hendrickson at this time and he introduced Mr. Dan Wile of the Detroit Lubricator Co. who gave a lengthy and very interesting talk on the subject of expansion valves and refrigeration controls.

Visitors for the evening, introduced by Mr. Hendrickson and by Mr. Jacobsen, were:

Mr. Grauer of the Detroit Lubricator Co., Chicago section, Mr. Knudsen, general manager, Detroit Lubricator Co., Mr. Al Hahn, Detroit Lubricator Co., Detroit, Mr. Jack McKenna, Detroit Lubricator Co., St. Louis, Mr. Ed Dussett and Mr. Tom Hart, both of Detroit Lubricator Co., Chicago, Mr. D. W. Pemer, Minnesota Mining and Mfg. Co. and Mr. Ross, Railways and Engineering Specialties, Montreal.

KANSAS CITY CHAPTER

Meeting of November 26, 1935

By C. F. RAMEY, *Secretary*
4322 Flora Ave., Kansas City, Mo.

APPLICATIONS of J. F. Leitner and R. L. Hataway were received and referred to membership committee who reported no other applications pending.

J. P. DeWilde, for the Committee on Standards, reported standardized price schedule would soon be ready for distribution.

A special communication was read from Mr. H. P. Scher, general counsel, enclosing questionnaire blanks, to be filled out and returned by membership with information helpful in developing the Credit and Collection Bureau; also a letter from Mr. Paul Jacobsen, 1st vice-president of the National Society, regarding plans followed by Chicago Chapter in arranging meetings, etc.

President Leitner made another appeal for payment of dues, inasmuch as the present year was nearing its close. For benefit of quite a number of visitors, President Leitner also reviewed the aims and purposes of the Society with a cordial invitation to all present and not members to become members.

Mr. R. F. Cox publicly thanked the visitors present who had responded to his invitation to meet with us.

Mr. R. F. Uhrig of the Graybar Electric Co. was introduced at this time and he in turn introduced Mr. C. A. Anderson of the Buss Manufacturing Co. of St. Louis, who gave us a very interesting talk on Fusetrons as applied to electric motors and house lighting circuits.

On recommendation of F. J. Leitner a rising vote of thanks was extended to the speakers for the talks given and Secretary Ramey was authorized to address a letter of thanks to each.

There being no further business a motion to adjourn was favorably acted upon, after which members and visitors joined in a very informal get-together and get-acquainted festival which was greatly enjoyed by all, there being an ample supply of a refreshing beverage and an abundance of sandwiches to match. The refreshment committee may well be proud of a good job well done, as a good time was had by all.

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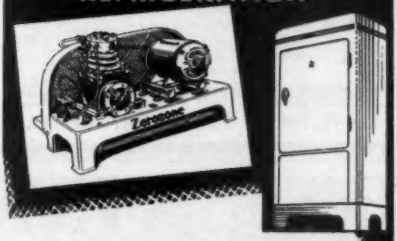

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President Leitner appointed R. E. Kingsolver to audit the Treasurer's accounts some time prior to annual meeting to be held in January.

R. E. Kingsolver offered some amendments to the Constitution as follows:

Article 8, Section 2—(To be changed as follows:) The chairman of these committees shall be appointed by each chairman for his specific committee. Such committeemen shall hold office for one year or until their successors are duly appointed and qualified.

Article 8, Section 4—Each officer elected, except the president, shall automatically become chairman of the standing committees as follows:

1st Vice-president—Educational and Entertainment Committees.

2nd Vice - president — Committee and Standards and Membership Committee.

Secretary—Investigating Committee and Committee on Cost Records.

Treasurer—Finance Committee.

Sergeant-at-arms—Visiting Committee.

Article 8, Section 5—Each officer shall have power to appoint the members of his respective committee.

Article 8, Section 6—Each officer shall submit the list of his chosen committeemen to the President for his approval.

Article 6, Section 5—Associate members will have no vote in the election of officers or questions pertaining to the welfare or policies of this association.

Article 7, Section 3—There shall be no member nominated for any office without his consent.

These changes and amendments were discussed and will be voted upon at the next meeting.

Motion by R. E. Kingsolver, seconded by R. F. Cox, that copies of these proposed changes and new amendments be sent to the National Secretary for approval before same are submitted to the members for a vote.

Meeting of December 10, 1935

Committee reports were as follows: Membership Committee, R. F. Cox, chairman. No new petitions received. Application of R. E. Clemenson reconsidered; application of R. L. Hataway accepted; application of J. P. Leitner, completed as of this date, will be reported on at the next meeting.

Committee on Standards, J. P. DeWilde, chairman. Price schedule being formulated will be ready for mailing to members interested about the first of the new year.

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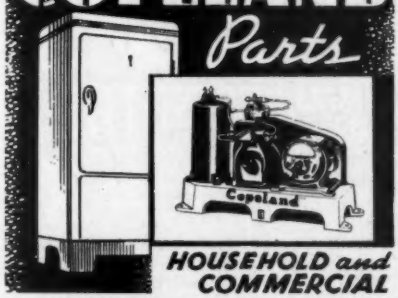

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- ☐ Circular: Physical properties of various refrigerants.

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Entertainment Committee, L. H. Roberts, chairman. Alco Valve Co. has offered to send a speaker for a January meeting. Rancostat Controls, division of the Automatic Reclosing Circuit Breaker Company will be glad to furnish a representative speaker for some future meeting. Mr. J. P. Leitner made a suggestion at this point of the meeting to have wives and lady friends of members present at an early meeting and to have something on the order of an inexpensive banquet, with perhaps dancing following, or other suitable entertainment. It was thought advisable by some to have such a meeting on some other night than a regular meeting night. These suggestions will be considered in arranging future meetings.

Special communication from Mr. H. P. Scher, general counsel, requesting a report on the questionnaire form from the Credit and Collection Bureau. It was thought advisable to have more information as to what services are to be had for the fees mentioned in the questionnaire.

A special communication from Mr. Geo. H. Clark, chairman of the National Educational and Examining Board regarding various membership requirements for 1936 was read. Same was referred to the Educational Committee for a report at the next meeting.

Some discussion took place at this time regarding use of Society funds for refreshments, entertainment features, etc., in making arrangements for future meetings. No definite decision was made. On motion of R. E. Kingsolver, seconded by H. F. Andrews, the Treasurer was authorized to pay to H. L. Green the balance of $2.00 due on the refreshments served at the meeting of November 26th meeting. Carried.

Meeting of January 14, 1936

The meeting of January 14 was held at the Commonwealth Hotel and was called to order at 8:30 P. M. by President S. A. Leitner with roll call of officers and members the first order of business.

Committee reports were as follows: Membership Committee, R. F. Cox, chairman. Application of R. E. Clemenson and J. P. Leitner approved. On motion by R. F. Cox, seconded by Mr. Green, a vote of the members was taken and Mr. Clemenson was ac-

cepted as an active member, and Messrs. Leitner and Hataway (whose application had previously been accepted by the Membership Committee) were accepted as associate members.

Following this the Society oath was given Mr. L. H. Roberts, Mr. Clemenson and Mr. Leitner.

Entertainment Committee, L. H. Roberts, chairman. Announcement was made that Mr. Bob Young of the Streamline Pipe and Fitting Co. will be present and address the members, after which refreshments will be served.

Special Auditing Committee. R. E. Kingsolver reported the treasurer's accounts in proper order and all funds accounted for. A motion made by T. L. Anderson, seconded by A. T. Kriegh, that report be accepted and approved was carried.

A special communication from National Secretary H. T. McDermott was read, giving approval of the change planned in the Constitution. Also, the Christmas greeting from Memphis Chapter was read, indicating and emphasizing that "Southern Hospitality."

President Leitner commented on the financial condition of the Chapter and broadcast a plea for payment of dues by those in arrears.

The matter of the suggested change to be made in our Constitution was brought up at this time and discussed. On motion by R. T. Ransdell, seconded by F. J. Leitner, the Sergeant-at-arms was made Chairman of the Investigating Committee, and the Treasurer was made Chairman of the Finance Committee and Committee on Cost Records. Motion carried. Following this, on motion by R. E. Kingsolver, seconded by J. P. DeWilde, the proposed changes and amendments in the Constitution were submitted for acceptance. Proposed changes and amendments as changed from the original amendments follow:

Article 8, Section 2—(To be changed to read as follows:) The chairman of these committees shall be the officers elected. The members of these committees shall be appointed by each chairman for his specific committee. Such committeemen shall hold office for one year, or until their successors are duly appointed and qualified.

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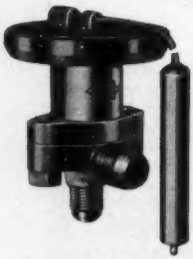

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The vote carried and the proposed changes and amendments were accepted.

Election of officers for the ensuing year was next in order. After the customary nominations, balloting, counting and recounting, the following list of veterans emerged to carry forward the chapter's fight for the coming year: President, R. F. Cox; 1st Vice-president, H. L. Green; 2nd Vice-president, T. L. Anderson; Secretary, R. E. Kingsolver; Treasurer, C. F. Ramey; Sergeant-at-arms, R. T. Ransdell; Board of Directors, H. F. Andrews, S. A. Leitner, J. P. DeWilde.

After a few acceptance speeches by the new officers and an open house discussion on plans for the future, meeting adjourned.

PLANS FOR 3RD ANNUAL CONVENTION TO BE ANNOUNCED IN MARCH ISSUE

IT is planned to have definite information on the dates of the meeting of the 3rd Annual Convention to be held in Memphis some time in November of this year, as well as the floor plans of the exhibit space available for the 3rd Annual Convention, ready for announcement in the March issue.

A preliminary meeting of the Memphis Convention Committees with National Secretary H. T. McDermott was held on February 2 and the various available hotels in which this meeting might be held were considered. The recommendations will be referred to the Board of Directors for final action.

PITTSBURGH CHAPTER

Meeting of January 13, 1936

By **F. V. GOLITZ,** *Secretary*
1518 Davis Ave., Pittsburgh, Pa.

THE regular meeting of the Pittsburgh Chapter was held in the Crafts Building, 408 Penn Avenue on January 13, President C. O. McCauley presiding.

Due to the large number of visitors and members present the meeting place was changed to the Crafts Building. All business was held over until the next meeting in order to give the educational speaker ample time to present his lecture.

Mr. Chas. V. Johnston was introduced and rst gave a lecture on the chemistry of sul-hur dioxide and methyl chloride. His ref-rence to the great amount of sulphur diox-e used commercially outside of the refrig-ration field was enlightening to the assem-y. This was followed by a discussion of ehydrators and their limitations. A motion ure of the manufacture of refrigerants the Virginia Smelting Company followed. In behalf of the members, President cCauley thanked Mr. Johnston for his mas-rful presentation of this interesting sub-ct.

* * *

CHICAGO CHAPTER CHATTER

By HERMAN GOLDBERG

GREETINGS and Salutations from your missing scribe.

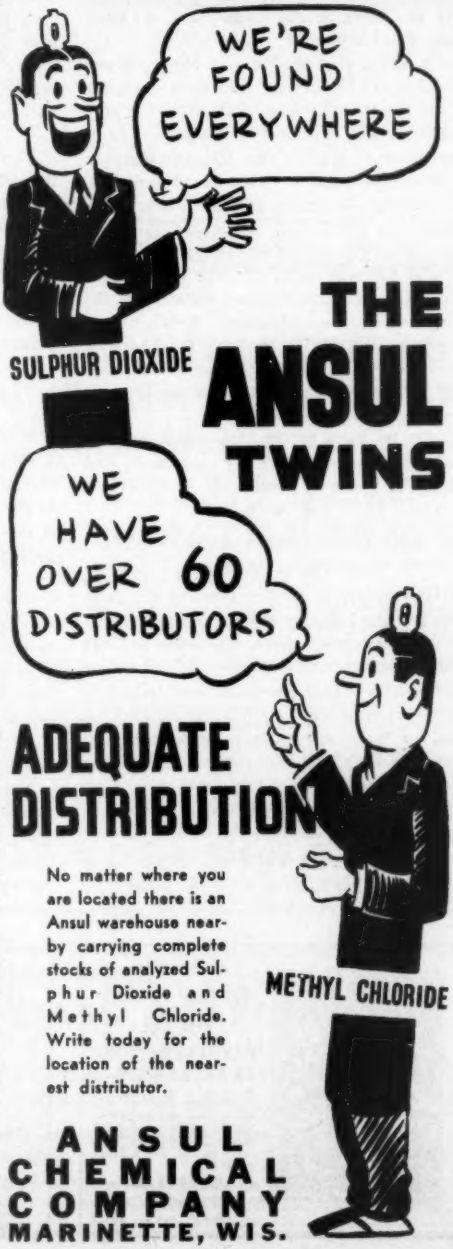
—Sorry I missed up on last month's issue, ut, after all, you fellows have been neglect-g to send in the usual dirt.

—There is bound to be some wailing and nashing of teeth because of a certain re-rigeration repair man moving his place of usiness from the close proximity of his wine ellar. I guess most of you fellows know hom I am talking of.

—A certain local refrigeration company is tuated in a store connected with a bank uilding. In the midst of a meeting of the ank's Board of Directors and just when he discussion became heated enough for one f the officials to open a window, it seemed o be the appropriate time for one of the efrigeration service men to purge a dirty O2 system, and it is surprising to know the ide scope of language bankers can use pon any and all occasions.

—Probably the beautiful surroundings of ur new headquarters at the Stevens Hotel ad something to do with it, but in all my istory and experience as boy and man I ave never seen an election of officers for apable and intelligent men go so smoothly s at our last election. Our chapter is to be ngratulated at the smoothness of opera-ons and lack of jealousy and politics which owed in this election.

—Your entertainment committee is very appy to report that plans are now being id for a gala banquet and entertainment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to be held at the Stevens Hotel the latter part of April or the early part of May. More about this later.

—Wonder what the boys in Memphis are planning or whether they have done anything as yet towards our next convention. I personally would welcome information from them because I know that Chicago Chapter is with those southern boys heart and soul.

—Herman Goldberg, of the Standard Refrigeration Parts Co., announces the purchase of all equipment of the McKinley Motor and Electric Co. of Chicago. This plant equipment has already been installed in the premises of the Standard Refrigeration Parts Co. at 5101 W. Madison St., where an efficient force of electrical repair and overhaul men are at work in the new department of electric motor service.

—I'll be back on the job again for the next issue, so let's have all your news and I'll try to put it in print.

"THE CONTRIBS COLYUM"

By THE KINGFISH

THIS seems to be the time of the year when the industry has nothing else to do but make up restrictions and rules to limit both themselves and everyone else. We have read a lot of these proposals and talked to a lot of men in the various lines and they all want to "hog" the business by establishing laws which in the end may prove to be boomerangs.

Of course it would be nice if one group could get all the business for themselves and put the industry on a profitable basis, but it seems difficult to get all parties to agree on a plan of mutual benefit.

The new membership button of the Society certainly is very attractive, and we are proudly displaying ours, but we shall have to cut additional buttonholes in our coat lapels soon in order to wear all the different buttons.

Election of local officers is the order of the day. We see that the Chicago Chapter retained its President Paul Jacobsen, and Secretary Harry Busby; Akron—C. L. Wall, president; Charles Hall, secretary; Kansas City—R. F. Cox, president; R. E. Kingsolver, secretary; Memphis—Geo. L. Uetz, president; R. F. Weidlein, secretary; Milwaukee—J. J. Geering, president; Wray Heath, secretary; St. Louis—E. A. Plesskott, president; J. D. Gray, secretary.

We hear that the National President James Downs and National Secretary H. T. McDermott are touring the countryside, one in the East and one in the middle West, so it won't be their fault if we do not have 1500 members by October, 1936.

It may be well for all of us to check our air pressure pumps and see whether the safety valves and high pressure controls are adjusted properly. It seems an unfortunate man run the pressure up too high and the unit blew up.

He suffered considerably before he died.

Judging by advance advertising by the Chamber of Commerce and by Mr. W. Hall Moss we are really going to enjoy ourselves in Memphis this fall. My better half says we ought to have a convention every three months.

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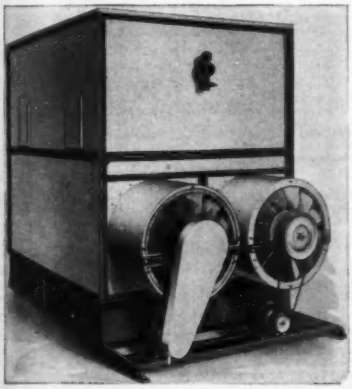

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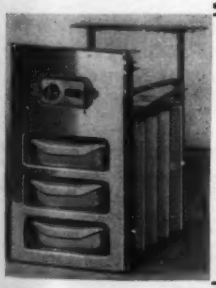

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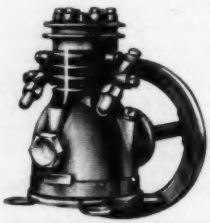

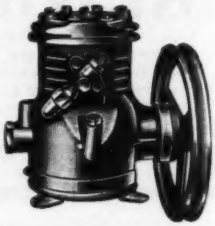

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Refrigeration Division

Here is a girl's definition of a bolt and a nut:

A bolt is a thing like a stick of hard metal such as iron with a square bunch on one end and a lot of scratching wound around the other end. A nut is the same thing only the opposite being a hole in a little chunk of iron sawed off short with wrinkles around the inside of the hole.

The newly elected president of Memphis Chapter, George Uetz, has appointed his local convention committees to make complete arrangements for the entertainment of the members and guests during the next convention. He is a "stickler" for promptness and regular attendance of the officers and committeemen. An important meeting was held at which Ed Hunt reported absent. In seeing Mr. Hunt the next day George wanted to know why. The only excuse Ed could give was the fact that he had decided to get married the evening previous. George accepted the excuse but cautioned him not to let it happen again.

We want to hear more in our Official Organ from the Ohio chapters—Cleveland, Akron and Youngstown. How are all the boys doing in these localities? There is one man who can expect a royal reception in Memphis: that is Ed Wright of Youngstown.

Pay Your Dues Now. **You can relieve the secretary and treasurer of your chapter undue worry if you will pay your dues promptly. Also it will prevent any interruption in the receipt of your educational material and your official organ, so again we say see your secretary and surprise him.**

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